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METRAZOL AS AN ADJUNCT TO THE TREATMENT OF MENTAL DISORDERS*

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When reports of the use of metrazol in the treatment of dementia præcox were introduced to workers in this country several years ago, we were skeptical of the striking claims made for the high percentage of recovery. When we observed the racking convulsions produced in patients by this method, and scrutinized the reports of frequent fractures and dislocations caused by the seizures, we were loath to subject patients to what seemed then to be unwarranted risks and stresses. The report by Dr. Horatio M. Pollock of less than 1 per cent recovery in over 1,000 cases of dementia præcox treated in the State hospitals with metrazol was certainly not encouraging. There was much said by various writers about the apprehension or even terror shown by patients having this treatment, and it was surmised by some persons that the treatment "frightened" the mental illness out of the patient.

However, in spite of the theories of Meduna, the originator of this treatment, regarding the mechanism of a "specific" effect on cases of dementia præcox, there seemed to be no valid reason why metrazol should be used only for that type of reaction, and it was not long before reports of favorable results of the use of the drug in other forms of mental disorders were forthcoming. Furthermore, as might be expected of the ingenious and careful American physician, who considers his patient first, methods were suggested for management of the patient during the convulsion, so as to avoid the fractures and dislocations previously occurring.

As a result of observations made at the Psychiatric Institute and other hospitals, the writers became convinced, in the fall of 1939, that the use of metrazol had merit in the treatment of emotional disorders, including those of the involutional period, and that proper management could avoid in large measure untoward results. Consequently, in November, 1939, the use of metrazol was begun at the New York Hospital—Westchester Division. Since

that time, and up to December 15, 1940, 112 patients have been treated with metrazol, and three months or more have elapsed since 104 of that number completed treatment. A technique of treatment has been gradually evolved. The writers' experience leads them to believe that metrazol is a meritorious adjunct to other methods of psychiatric treatment, and that undue hazards in its use can be avoided.

In this paper, the writers wish to describe the method of their use of metrazol, and to report the results obtained by them. The purpose is to call attention to the value of metrazol when judiciously used with other psychiatric methods, and to allay some fears that may have been aroused by previous unfortunate experiences reported by others. We feel that not a few patients in the New York State and other psychiatric hospitals may be benefited by metrazol treatment and suggest consideration of resumption of its use where and if it has been discontinued, or institution of the treatment if it has not been used.

The procedure at New York Hospital—Westchester Division is as follows: Before any metrazol is given, each patient has a thorough physical examination, including electrocardiogram, X-ray of the spine, and clinical laboratory tests. When it is decided that the patient is suitable for treatment, his personal physician, as well as the physician giving the metrazol treatment, explains to him carefully, before treatment, the details of the procedure, answering questions the patient may ask. This session ordinarily precedes the treatment by several days; and, in the writers' experience the matter-of-fact discussion of the treatment, formulating reasons for its use in the specific instance, has done much to dissipate the fear of the procedure which has been so prominently described in most articles on metrazol and which has not been a matter of great note with the writers' patients. Patients are told specifically that they will "go to sleep" as a result of the metrazol treatment and that they will wake up confused and bewildered; that this state will pass away in a few minutes; and that a nurse and physician will be there to supervise their care. This, in the writers' belief, has helped prevent panic reactions in the postconvulsive confused state which had been noted in a few patients who had not received previous explanation.

Patients generally have accepted the treatment with no more distress than that attending a venipuncture for blood chemistry tests. A considerable number of patients have not only asked for but demanded treatments. Most of the patients who have had insulin shock therapy followed by metrazol therapy have expressed their preference for the latter. Treated patients have joked about being members of a "metrazol club" and have been distinctly helpful in cooperating with the staff in reassuring those patients who are indecisive about accepting proposed treatment. The occasional non-cooperative patient has had treatment while in a cold wet pack, with one arm free for the injection, the other held at the side by the enveloping pack sheets. The pack is applied about one hour before the expected metrazol treatment and in itself tends to relax the patient. The reasons for the use of the pack are told to the patient, and he is encouraged to take his next treatment without it.

The treatment is given in a large dormitory room. A special wooden table, of convenient height and covered with a hard mattress, is used. The patient reclines on the table with his back hyperextended by a firm doubled pillow. It is seldom that the patient has to be forcibly placed on the table; encouragement and reassurance generally are sufficient with ambivalent patients. The pelvis is held by a canvas band which crosses the lower abdomen at the level of the spines of the ilia and is tied beneath the table. One nurse stands at the side near the foot of the table and controls the movements of the legs during the convulsion. A second nurse stands at the head of the table, firmly holding the arms flexed on the chest, and keeping the shoulders on the table. A third nurse assists the physician with the injection, after which she supports the chin with one hand and places a soft rubber gag between the teeth when the convulsion ensues. Following treatment, patients are placed in bed with tie sheets across their shoulders and torsos, preventing wide movements of the arms. The bedclothes themselves prevent such movements of the lower extremities. Each patient is supervised by a nurse until recovery from treatment. Such supervision helps allay the fear and confusion generally associated with the postconvulsive state.

In the writers' experience nausea was usual and vomiting a common symptom following treatment until the practice was started of

giving sodium amytal, 3 gr., to the patient just before the metra-
zol injection. Retching and vomiting have been eliminated, and
nausea is but a mild and occasional symptom since this procedure
was instituted. The writers feel that this is a definite addition to
the technique—particularly because of the appearance of a report
from another source of a death from a cerebrovascular accident as-
sociated with protracted vomiting in the posttreatment period.

A 10 per cent solution of metrazol is used in the treatment. Or-
dinarily the amount given at first is 4.5 cc. for women, 5 cc. for
men. This is usually sufficient to produce a convulsion at the first
treatment. The dosage is gradually increased by from 0.2 cc. to
0.5 cc. at each treatment because tolerance to the drug develops. If
a convulsion does not result, a second injection, 0.5 to 1 cc. greater
than the first, may be given a few minutes later. If a convulsion
does not ensue, with this, no further attempt is made on that day,
but on the following day treatment is resumed. As a rule, injec-
tions are given three times weekly on alternate days.

The usual number of treatments given in a single series is six.
No patient has had more than 13 in a single series. However, it
has been found, from repetition of the course in 25 patients, that
an additional series may bring about improvement that was not
shown in association with a previous course.

Although as many as 13 treatments have been given in a single
course, it is believed that if no improvement is evident by the fifth
or the eighth treatment, it is better for the patient to have a rest
interval rather than to continue the same series.

The incidence of increased agitation following "missed" convul-
sions has not, in the writers' experience, been a prominent or sig-
nificant finding; and, frequently, continued improvement has en-
sued under such circumstances. However, this situation is care-
fully discussed with the patient when it occurs, and at the earliest
possible moment.

Patients receive intensive personal psychotherapy, at first of a
reassuring nature. They are seen several times a day for short
periods during the first few treatments, and later, as they improve,
for longer periods, once daily or every other day, as the capacity
to benefit from more intensive work is found.

The ease with which a firm transference is attained in treatment with metrazol under these conditions is striking and has not been seen under any other circumstances, even with patients undergoing insulin shock therapy. Interviews shortly after treatment, when the patient has cleared from the postconvulsive confused state, tend to be more productive. The barriers to discussion of conflict situations appear to be definitely lowered at this period.

One usually observes in the treated patient a reduction of tension and finds evidence of stimulation of the vegetative functions. It is the writers' opinion that these factors largely determine the objective improvement. The similarity between the decrease in visceral tension associated with metrazol convulsion in the psychotic and that following a pleasant alcoholic evening among those who use alcohol successfully, or the similarity between the state following the metrazol convulsion and that following orgasm in the normal individual, is striking. The comparison seems even more apt when it is recalled that our patients so often lack capacity for just such "normal" outlets.

Detailed family and personal histories previously taken, plus a careful record by both nurses and physicians of the patients' trends of thought expressed during the acute illness, ordinarily give leads to the basic personality conflicts. Such information is tactfully used as bases for psychotherapeutic discussions when there is improvement from treatment. It is rather striking that a probing psychodynamic approach in patients having metrazol therapy does not seem to have the distressing emotional aftermath in general that such technique so frequently causes in patients who are not having such treatment. It appears that psychological tensions are drained with each succeeding convulsion, so that a dangerous level of tension does not follow discussion.

An active relationship with the patient is, therefore, most advisable during treatment, as it gives the opportunity of at least partial desensitization of the patient to his conflicts by verbal catharsis, thus making posttreatment interviews more comfortable and productive.

Relief of symptoms of the depressed and agitated state, in the writers' experience, has been frequently associated with a pathological, though not marked, elevation of mood, with a rather defin-

ite tendency to enjoy the present in a care-free manner with little realization of the serious phases of adult life which involve personal responsibility. As the patient more soberly faces his real life situation, this state is followed frequently by a temporary and mild reactivation of the depression—an interesting and challenging psychotherapeutic situation for the physician.

Another aspect of the physician-patient relationship, which is of undeniable importance, is the duty of the physician to widen the patient's social horizon, by encouraging the development of new interests and contacts in the world about him. Knowledge of the patient's prepsychotic personality, and of previous interests and capacities, is useful in preparing an individualized schedule of activities which will best result in personal satisfaction from accomplishments in fields best adapted for the patient. As the prepsychotic history of the patient so often shows a lack of sublimating recreational outlets, it has always been the writers' policy to try to help patients develop new interests in lines of physical education, hobbies and socialization. Careful attention to individual needs in occupational therapy, physical education, and social relationships is necessarily an important duty of the physician during the state of improvement, when the patient is especially sensitive and responsive.

It is a good policy not to push the patient too hard during his early period of gains. In spite of marked improvement in the patient's behavior, it is surprising how little confidence he has in himself. He has much less than has a patient with a spontaneous remission of symptoms, who has improved to a similar level but not in such a sudden and dramatic fashion.

There is possibly too little recognition that metrazol, like aspirin, alleviates symptoms without affecting to any marked degree the underlying pathological process, and that, therefore, it can only be an adjunct to the total psychotherapeutic effort of the physician in his treatment of the patient.

Treatments should be given, not with the expectation of curing the patient by them, but only with the aim of bringing the patient to a higher level of adjustment, where he has greater capacity to gain insight and satisfaction from the realities about him. It must be borne in mind, of course, that a probing psychotherapeutic ap-

proach must not be used indiscriminately, but is to be employed preferably with those individuals whose prepsychotic personalities show a relatively adequate ego development.

Lectures concerning the procedure of using metrazol and the part it plays in the total treatment of patients have been given to the hospital personnel, including nurses, attendants, and the physical education and occupational therapy personnel. These talks have been of distinct aid in bringing about a salutary degree of total cooperation in each individual case. All of these members of the personnel have had the opportunity to see a treatment, so they will be able further to appreciate the experience which the patient undergoes.

It must be borne in mind that a prolonged psychotic state in itself results in the tendency to develop personality habit patterns of a deleterious nature. It is the duty of the physician to aid the patient, in the period following improvement from treatment, to substitute new and more efficient patterns for the old. In particular, persons who have suffered from affective psychoses, should not be discharged shortly after recovery from acute symptoms.

RESULTS OF TREATMENT

The technique of metrazol treatment has been described, and the principles of management of the patients have been outlined. Details of the case material will now be given and the results reported. It has been mentioned that the total number of patients treated with metrazol during the past year at the New York Hospital—Westchester Division was 112; of these, 32 were men and 80 were women. The ages varied from 17 to 66 years. Eighteen were in the third decade, 28 in the fourth decade, 26 in the fifth, 28 in the sixth, and nine in the seventh. The duration of symptoms before metrazol varied from less than six months (25 patients) to 10 years. Twenty-nine patients had been ill from six to 12 months, 24 from one to two years, and 34 for more than two years.

According to the diagnostic groupings, there were 32 cases of dementia præcox, 51 of manic-depressive reactions, 19 of involutional psychoses, nine of the psychoneuroses, and one case of psychopathic personality.

It was not considered that any patient was recovered at the termination of a course of metrazol treatments, but of the 112 patients, 64 were regarded then to be much improved, 35 improved, and 13 unimproved.

Some patients will continue to show improvement for several months after metrazol treatment, and others will relapse during a similar period to their former conditions. Consequently, the report given here is of the conditions, as of December 15, 1940, of 104 patients who completed the metrazol treatment not less than three months previously. The time elapsed since the treatments varies from more than three months to one year. The conditions to be reported are as follows:

Of 51 manic-depressive patients treated, 29 are at home, 26 of these recovered, and three much improved; 19 are in the hospital in an improved condition. Thus, 48 of the 51 are considered to have benefited by treatment, only three showing no improvement.

Of 16 patients who had involutional psychoses 13 are at home, 10 recovered and three much improved; two are in the hospital in an improved condition. Thus, 15 of 16 are believed to have benefited by treatment. Only one patient showed no improvement. The rapid gain shown by some of these patients, leading to prompt recovery where the outlook seemed previously very poor, has been most striking.

Of eight psychoneurotic patients, seven are at home, four recovered, and three much improved. One remains in the hospital in an improved condition. All appear to have benefited by treatment.

Of 28 dementia præcox patients, seven are at home, three of these recovered and four much improved; 11 others are in the hospital in an improved condition. Thus, 18 of 28 benefited by treatment; 10 remain unimproved.

The one patient with a psychopathic personality left the hospital unimproved two months after metrazol treatment. A recent communication indicated an improved condition.

In summary, (see Table 1) of the 104 patients who have completed treatment with metrazol not less than three months ago:

Fifty-seven are living at home, 43 of them recovered, and 14 much improved.

Thirty-two are in the hospital in an improved condition, several ready to leave soon.

Eighty-nine patients, therefore, are considered to have benefited by treatment.

Fifteen patients are considered unimproved by treatment.

TABLE 1. RESULTS OF METRAZOL TREATMENT (3 TO 9 MONTHS AFTER TREATMENT) RELATED TO DIAGNOSIS AND DURATION OF ILLNESS BEFORE TREATMENT

Duration of symptoms before first treatment	No. of cases	Psycho. neuroses	M. D. dep.	M. D. mixed	M. D. other types	D.P. simple	D.P. cat.	D. P. par.	Invol. psych.	Psych. pers.
Less than 6 months..	21	2	4	4	1	..	5	2	2	1
Recovered	..	2	1	2	1	..	2	..	2	..
At home, much impr.	..	..	..	..	..	..	..	..	..	1
In hospital, impr. ...	..	..	3	2	..	..	1	2	..	..
Unimproved	..	..	..	..	..	..	2	..	..	..
6 to 12 months	27	1	6	11	1	..	2	1	5	..
Recovered	..	1	5	5	1	..	1	..	4	..
At home, much impr.	..	..	..	2	..	..	..	..	1	..
In hospital, impr....	..	..	1	4	..	..	1	1	..	..
Unimproved	..	..	..	..	..	..	..	..	..	..
1 to 2 years	21	2	3	8	..	..	3	1	4	..
Recovered	..	..	2	2	..	..	..	..	3	..
At home, much impr..	..	2	..	..	..	..	..	1	..	..
In hospital, impr....	..	..	..	4	..	..	..	..	..	..
Unimproved	..	..	1	2	..	..	3	..	1	..
Over 2 years	35	3	4	8	1	1	4	9	5	..
Recovered	..	1	1	6	..	..	..	..	1	..
At home, much impr.	..	1	1	..	..	..	..	3	2	..
In hospital, impr. ...	..	1	2	2	1	..	4	1	2	..
Unimproved	..	..	..	..	..	1	..	5	..	..
Total	104	8	17	31	3	1	14	13	16	1

The hospital has had no deaths as a result of, or in connection with, metrazol treatment. There have been no serious accidents associated with the treatment. There have been no fractures or dislocations of the long bones. In only a few patients, have there been dislocations of the jaws; and these have been easily reduced during the postconvulsive stuporous period, without the patients having been aware of their occurrence. One patient suffered a chip fracture of the scapula with no serious consequences. This

patient has had two subsequent courses of metrazol treatment without complications and has no loss of shoulder function.

In only two instances did X-rays of the spine reveal fracture of a vertebra after treatment: One was in the case of a 64-year-old woman with an unusual spinal configuration which prevented satisfactory hyperextension; the only symptom was transitory pain in the back. The second patient was a 51-year-old man with arthritic changes in the spine associated with a marked kyphosis. This condition also prevented satisfactory hyperextension of the spine. The X-ray after treatment suggested a compression fracture of the fourth thoracic vertebra; he had transitory back pain from which he has recovered. On the other hand, X-rays of the spine taken of all patients before treatment showed old fractures in six patients, deformities and other pathology that might have been ascribed to metrazol convulsions if they had been observed for the first time only after metrazol treatment. The writers, therefore, advocate spinal X-rays preliminary to treatment as a desirable procedure.

It is believed that none of the group of patients studied has been made worse by the use of metrazol, nor has evidence of permanent brain damage been seen. Not infrequently, after a series of metrazol convulsions, patients show varying degrees of confusion and some forgetfulness, lasting a few days or sometimes longer; but in all instances these symptoms have eventually disappeared. The patient who showed the longest period of this organic reaction returned to her former position as chief librarian in a large metropolitan library over six months ago and has been considered as efficient as before her illness—and better balanced. It is not maintained that metrazol treatment cures patients who would not by other methods eventually recover. From the writers' experience, they do believe that in patients who have the capacity for recovery, metrazol treatment brings about a change which facilitates other forms of treatment and accelerates recovery, so that hospital residence is shortened, sometimes in a strikingly dramatic manner. Its judicious use for this purpose is advocated.

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LEBER'S PRIMARY OPTIC ATROPHY WITH OTHER CENTRAL NERVOUS SYSTEM INVOLVEMENT

BY SERGE ANDROP, M. D.

Leber's disease is an hereditary affection, characterized by a primary atrophy of the optic nerves, with a rapid loss of vision, contraction of the visual fields with central scotomas, usually occurring at puberty or shortly after. It is much more prevalent among males than females, often attacking several in the same family. Although it can appear for several generations without a break, it usually skips one or more generations. It is said by some to be dependent upon a sex-linked factor, but proof to this effect is lacking.

Although von Graefe[1] was first to report this condition in 1858, Leber[2] presented a classic description of the disease in 1871, with a definite statement as to the mode of onset, the influence of heredity and the prognosis; and little has been added to the knowledge of the disease by subsequent writers. Although cases have been described by British, French and German authors, very few American reports are to be found. A thorough search of the literature indicates that there has never been a postmortem examination recorded in Leber's disease; and the primary seat of the affection has not yet been definitely determined. Leber's disease is an unusual condition. Merritt[3] remarks on the little attention paid to it in American medical literature. However, it is of interest to neurologists because of its close relationship to other heredodegenerative diseases of the central nervous system. Although isolated European writers have called attention to other neurologic abnormalities in some of their patients, very little evidence of associated psychoses and organic nervous lesions has been recorded. In this communication, the cases are presented of two siblings with Leber's disease, showing other central nervous system involvement.

REPORT OF CASES

Family history: The important facts in the family history of the patients, as seen in Chart 1, are as follows: Both paternal and maternal grandparents had defective vision and wore glasses (1, 1 and 2, 2). Four paternal uncles and one aunt had defective vision and wore glasses (3, 3). Several maternal uncles and aunts had defective vision and wore glasses (4, 4). The
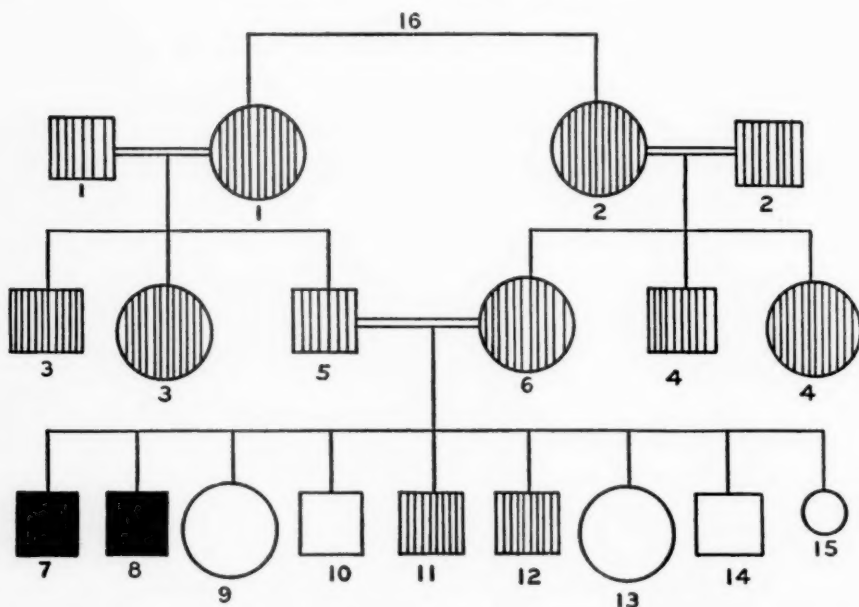
Chart 1. Legend: Squares=Males; Circles=Females; Double Lines=Lines of
Mating; Horizontal Lines=Lines of Siblings; Vertical Lines=Lines of
Descent; Black=Leber's Disease; Striped=Defective Vision.

father, aged 71, has divergent strabismus of the right eye, blurring and
haziness of the discs, defective vision; he has worn glasses all his life; in
the past two years he has developed nervousness, numbness and tingling in
the extremities (5). The mother, 68, has astigmatism; she had left school
at 14 because of defective vision; she wears glasses; she has recently been
operated on for intestinal cancer (6). L. N., aged 36, has optic atrophy
with other central nervous system involvement (7). J. B. N., aged 35, has
optic atrophy with other central nervous system involvement (8). One
sister died when two weeks old, from weakness due to prematurity (9). One
brother died when 15 months old, following spasms (10). One living brother
has defective vision and wears glasses (11). Another brother has some
pallor of the disc in the left eye, an area of choroiditis below and tempo-
rally from the disc, extending up toward the macula but not involving
the fovea, vision 20/15 bilaterally; his eyes are prominent, and there is
hyperthyroidism (12). A sister, apparently normal, wears glasses for read-
ing (13). Another brother is apparently normal (14). Two siblings were
miscarriages (15). The grandmothers were sisters (16); a maternal great-
aunt was psychotic. A paternal uncle and the maternal grandmother were

tubercular. All living members are of asthenic habitus, none of the present generation is married; and the apparently normal brothers and sisters are still within the age of the disease incidence.

Case 1.

J. B. N., male, single, salesman, 35, was admitted to the Spring Grove State Hospital, Catonsville, Md., July 24, 1933.

Eye condition: J. B. N. went to the Wilmer Institute in June, 1929, at the age of 23, with a complaint of sudden loss of vision in the left eye three weeks previously, and in the right eye a week previously. His vision at that time was 10/200, right eye and 1/200, left eye. Both nerves showed optic atrophy. The color of the discs was normal. There was absolute central scotoma of 10° to 20° in both eyes. Reexamination in 1933 showed a large central scotoma in the vision of each eye and primary optic atrophy with vision, right, 1/200 and left, 2/200. Chart 2 and Figure 1a. Diagnosis: Leber's disease.
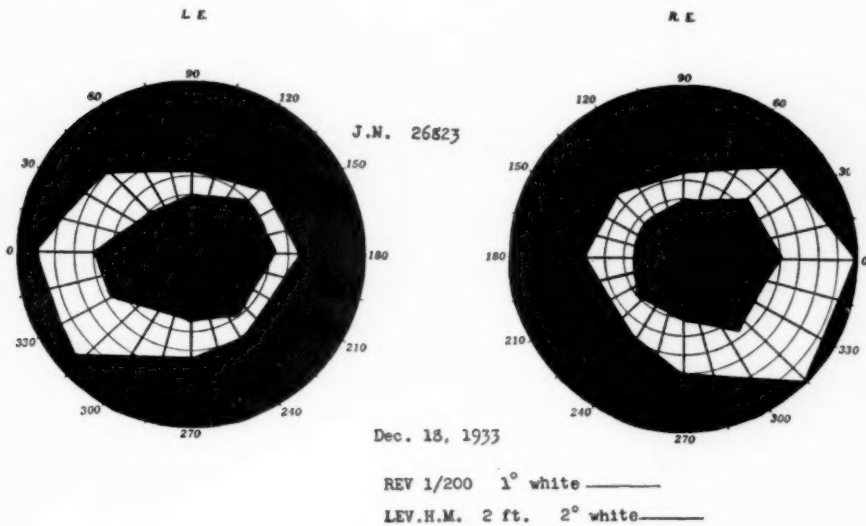

Chart 2. Field of Vision. J. B. N.

Other central nervous system involvement: J. B. N. had a normal birth and normal childhood development, was graduated from high school at 16, an excellent student. He had worked on newspapers and in a printing shop in an advertising capacity, changing positions frequently. He was a fairly good mixer. For nine months preceding the discovery of his illness he drank considerably. He had always been shy, retiring and sensitive.

For about a year before admission, he had shown increasing depression. He felt his family was "against him" and was responsible for his inability to make a living. A week before admission, he became extremely depressed, stayed indoors, ate very little, and believed he was going to die. He thought someone was following him and that he was going to be hit by an automobile. He prayed, told a priest that he was going to die and wanted to confess his sins. He then became violent, thought his father was the devil and was going to kill him. He thought a male friend was his wife and that he himself was God. He began to hear voices. He feared he had contracted syphilis from a girl whom, he insisted, he would marry. He did not know how it was done, but believed his friend had hypnotized him. Upon admission, he was oriented, coherent but at times irrelevant. He spoke freely of his delusional material; he was hallucinated in the visual, auditory and olfactory fields. General information and grasp were adequate, judgment and insight poor. Diagnosis: schizophrenia, paranoid. After seven years in the hospital, J. B. N. shows considerable mental deterioration; is delusional, hallucinated; his judgment is very poor; and he has no insight into his condition. The mental deterioration, although slow, is steadily progressive. Neurologically, his pupils are extremely dilated but react to light and in accommodation; there is inability to converge without conjugate deviation. He has a slight tremor of the fingers, the deep reflexes of the upper extremities are normal, of the lower extremities, hyperactive. There is no plantar response. The patient walks clumsily on a broad base. His Wassermann is negative. X-rays of the sella turcica and skull are negative.

Case 2.

L. N., male, single, a former student, aged 36, is mentally normal.

Eye condition: At the age of 16 he noticed pinhead spots on letters, as he read; and there has been progressive loss of vision since. He was first seen at the Wilmer Institute on May 28, 1926, at the age of 22, when he complained of inability to read. At that time, vision was right, $\frac{1}{2}/200$; left, $1/200$, and this could not be improved with glasses. There was a large central scotoma in each eye and some constriction of peripheral fields. Flat-edged atrophic nerveheads were seen, with moderately contracted vessels. Reexamination in 1936 showd 4/200 vision in each eye; but he was unable to read any fine print. Chart 3. and Figure 1, b. Diagnosis: Leber's disease.

Other central nervous system involvement: At the age of 14 a disturbance in speech and clumsiness in the use of L. N.'s arms were noticed. They continued to progress with the development of the optic symptoms. At the present time the findings are: In general, the muscles of the body are slender with a very marked under-development of muscles of hands and feet.
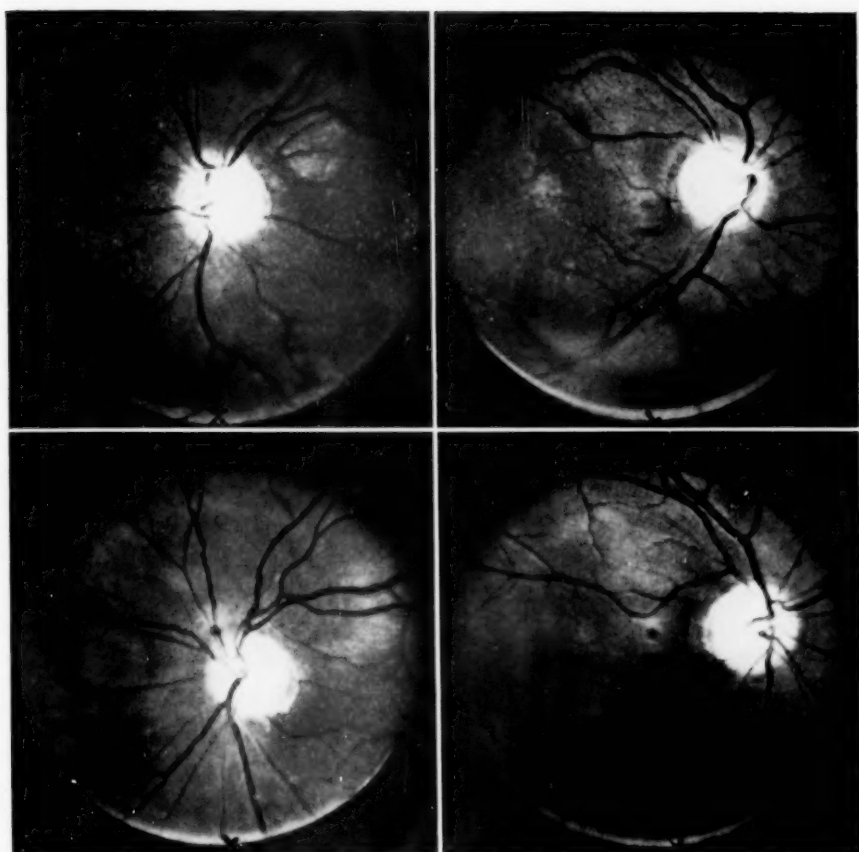
Left Eye   Right Eye

Fig. 1.   Photographs of the fundi oculi, taken with a Zeiss reflex free retinal camera, and showing optic atrophy. Above J. B. N. (Fig. 1a) and below L. N. (Fig. 2b).

L. E.

R. E.

L.N. 167177
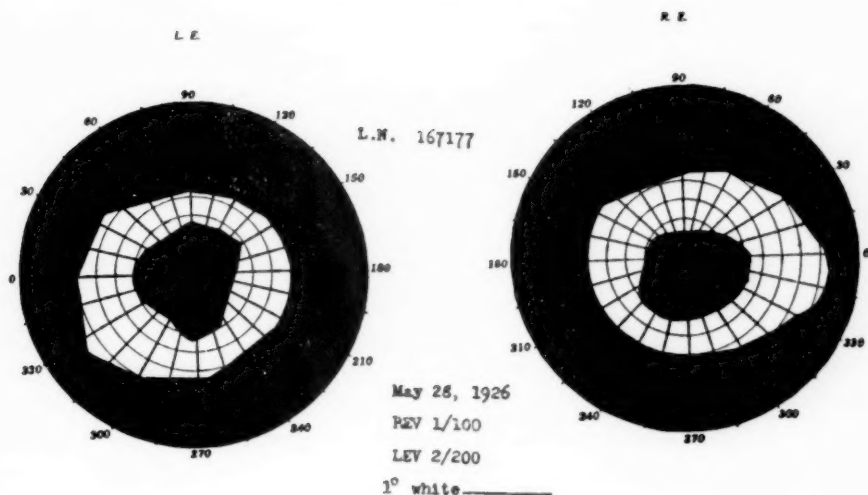
May 26, 1926

REV 1/100

LEV 2/200

1° white

Chart 3. Field of Vision. L. N.

There are no involuntary movements of muscles, but most movements cause an overflow of innervation into muscles which should not participate. The patient holds himself stiffly, with the appearance of muscle rigidity, maintaining strange postures of the fingers. There is drooping of the wrists on extension of arms. There is marked drooping of the left shoulder; and the thoracic spine is curved to the right with a pronounced lumbar lordosis. When he walks and talks, there are associated movements in the muscles of the forehead, neck, arms and trunk, which are poorly coordinated. There is a slight tremor of the hands and fingers; and the fingers are flaccid. There is a marked weakness of the flexor, adductor, and abductor muscles of the fingers and toes. The thenar and hypothenar eminences are atrophic. When L. N. is relaxed in a supine position, the muscles of the neck and chest approximate the normal tonus. All movements are jerky and irregular. Muscles of the hands are weak and cramp when used. There are no signs of cerebellar ataxia, and there is no loss or diminution of any form of sensibility. Slight choreo-athetoid movements of tongue and muscles about the mouth are noted. The pupils are slightly dilated. They react to light and in accommodation. There is poor convergence, with conjugate deviation to the right. Finger to finger and finger to nose coordination are adequate. Abdominal reflexes are poor, the left cremasteric is poor, the right, good. Deep reflexes are poor in the upper extremities and hyperactive in the lower. Babinski and Romberg tests are negative. Speech is jerky, stammering and slurring, almost unintelligible. The mental condition is normal, somewhat euphoric. L. N. is a student, and 15 years ago was an honor col-

lege student, despite his poor vision. His Wassermann is negative; and X-rays of the sella turcica and skull are negative.

DISCUSSION

In one of his papers Leber pointed out that the disease is often found in families with a neuropathic taint, not necessarily a taint indicating organic nervous disease. He also stated that his patients often suffered from periodic headaches, vomiting, nervousness, vertigo, weakness and palpitation, and that recurrent convulsions were also observed. However, Leber's disease has been regarded as a pure clinical entity, uncomplicated by other morbid conditions in the nervous or other systems. Leber himself quite definitely excluded from his cases all instances of optic atrophy associated with nervous disorders.

Since Leber's studies, and in spite of the relatively few reports of the disease, reports of nervous system involvement outside of the optic nerve have appeared. Various grades of mental defect have been described. Nettleship[4] found nine instances of epilepsy in a family affected with Leber's disease. Behr[5] observed spasticity, increased tendon reflexes, cerebellar ataxia, mental defect, deficient bladder control, and various malformations in a family of six children with typical ophthalmological disturbances. Taylor and Holmes[6] called attention to other neurological abnormalities in some of their patients. A psychosis in the family of a Leber's disease patient was reported by Story.[7] Ford[8] observed epilepsy and migraine associated with the disease. Merritt's patient had talipes which were described as inherited from the mother.

Imamura and Ichikawa[9] report a case with euphoria, slow cerebration, poor memory, vague orientation, slight weakness of right face, tremors in trunk, tongue, and fingers, aggravated by voluntary movements with some rigidity of extremities. Ferguson and Critchley[10] report four cases, in one of which epilepsy and mental defect were associated, and, in another, pyramidal tract degeneration, ataxia, and loss of proprioceptive sensibility; they also mention disturbances of speech and abnormal postures. Curran[11] reports compulsive features in a patient with Leber's disease. Other symptoms reported, suggestive of organic nervous disease associated with Leber's optic atrophy are: tingling and numbness in

hands and feet, tremors of lips and face, giddiness, sluggishness or absence of knee and ankle jerks, headache, weakness and pain in legs, and some difficulty in controlling sphincter of the bladder. Some—always transient—mental symptoms were occasionally observed such as: depression, restlessness, irritability, confusion and amnesia. Ferguson and Critchley in 1928 called attention to the relationship of the disease to the heredofamilial ataxias. Leber, in his original paper, admits that "in many of our families there occurred neurological appearances, chiefly of minor degree, so that these individuals are referrable to the group of neuropaths." Taylor and Holmes state that although it is true that there is very little direct evidence of the nature of the primary lesion in Leber's disease—owing to the absence of histological examination—in its acute stage, it is generally assumed that it is inflammatory. And if this were so, it would not be surprising if there were occasionally lesions elsewhere in the nervous system. There are several hypotheses as to the pathogenesis of the disease: First, an inherited temporary disorder of the pituitary gland; second, meningeal inflammation round the optic foramina; third, toxic retrobulbar neuritis, due to some neighboring sepsis, and affecting tissue which bears an inherent vulnerability; and lastly, a primary neuronic degeneration localized in the optic nerve.

In the absence of postmortem material it is difficult to take a positive stand. From the clinical course and the genetics of the disease, however, the hypothesis of primary neuronic degeneration is favored by the writer. Some of the affected families are of what might be termed degenerative stock. Hormuth's[12] theory is that affected persons are born with a weak papilla-macular bundle; and he holds, that the factor precipitating the onset of the disease is unknown. It has also been emphasized that the changes of Leber's disease occur at a time of life when tissue alterations are profound throughout the body, and that if there is an inherent tendency toward incomplete development of tissue, degeneration results, and the cells die. If the dying cells are the ganglion cells of the retina, the picture of ascending instead of descending atrophy of the optic nerve appears. Another support to this hypothesis is the fact that very rare cases show complete recovery. A tendency to slight improvement in vision was explained by Wilmer as being due to the

fact that the patient learns to accommodate himself to his central scotoma and use the periphery of his retina to better advantage.

The two siblings presented in this paper, showing a primary optic atrophy, also present symptoms of other central nervous system involvement. J. B. N., with a chronic delusional and hallucinatory affection, with definite progressive mental deterioration, points to an involvement of the cortex. L. N. has definite neurological findings pointing to an involvement of parts of the pyramidal and extrapyramidal systems. Despite these unorthodox features, there is no doubt that the familial affection is one of Leber's disease. The writer is tempted with Ferguson and Critchley to regard the pathological condition in this family as an example of a "neurone degeneration, which has affected not only the optic nerve but also other structures of the nervous system, this way forming a connecting link between Leber's atrophy and the wide group of the heredofamilial diseases." Several interpretations may be given to the cases presented: They may be considered as belonging to the Leber's disease type, differing only by the coexistence of the organic nervous involvement; or they may represent a different type of familial degeneration—related to Leber's disease only by the fact that the visual apparatus is likewise affected.

In presenting the two cases of primary optic atrophy with other central nervous system involvement, the writer was guided by the same principle as that of Ferguson and Critchley that "apart from their intrinsic rarity, the conditions recorded in this paper are of importance in that they may throw some light upon neurological problems of interest. The association of psychiatric and neurological findings may contribute to our knowledge of the etiology of Leber's disease by suggesting that the essential pathogenic process is a neuronic abiotrophy, limited in typical cases to the optic nerve." Accordingly, to the extent of our present knowledge, we may view the disease as a "familial abiotrophy of the optic nerve which may extend or be accompanied by degeneration in other parts of the central nervous system." As there are no reports in the literature on pathological studies in autopsied cases, the diligent search and study of pathological material coming to necropsy will greatly add to our knowledge of this interesting condition. It

may even aid us in answering the question that presents itself, whether the "other central nervous system involvement" should be attributed to the same degenerative process affecting the optic nerve and, therefore, is to be considered part of the disease, or whether there is only a chance association of two separate and distinct processes.

SUMMARY

1. A brief review of the literature on Leber's primary optic atrophy with other central nervous system involvement is here presented. Attention is called to the extreme paucity of such reports in the American literature.

2. Two cases of the disease with other central nervous system involvement are presented and briefly discussed as to nosology and relationship to the heredofamilial group of diseases.

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THE ALCOHOL SUSCEPTIBILITY SKIN TEST

BY DOUGLAS McG. KELLEY, M. D., AND S. EUGENE BARRERA, M. D.

The alcohol susceptibility skin test devised by Nagle,[1,2] while not yet adequately verified by studies involving comparison with the blood alcohol content, has been clinically checked in enough cases to make its further study worth while. In the present study, an experimental procedure was set up wherein skin readings could be directly compared with clinical alcoholic states and checked by careful laboratory estimations of the blood alcohol content of the various subjects.

Before the experiment is discussed, however, the three specialized techniques, employed as basic tools for the present work, should be described.

1. A method of estimating by clinical observation a specific level of psychological impairment.

2. A method for the determination of blood alcohol levels.

3. The alcohol susceptibility skin test.

Brief descriptions of these three techniques will be of value, first, to indicate their place in the experimental method, second, to clarify the specific qualities and limitations inherent within them.

ESTIMATION OF SPECIFIC LEVELS OF PSYCHOLOGICAL IMPAIRMENT

In the clinical estimation of the amount or degree of alcoholic intoxication of an individual, a number of methods may be employed. Probably those most commonly described in the literature are of the type used by various psychologists, which utilize a multiplicity of performance problems. These methods, however, almost all rely on the fact that the individual is tested for some given performance before the ingestion of alcohol, following which variances after ingestion can easily be noticed. In actual clinical practice, however, the individual is almost never seen until after the alcohol has been taken, and he is brought into the police court, medical examiner's or physician's office in a state of alleged intoxication, it being then necessary to decide upon his degree of drunkenness. Jetter[3] has attacked the problem from this viewpoint; and his criteria can be applied in this study, although Jet-

ter's experiments were used on individuals who were markedly intoxicated, and in the present problem only mild intoxication is desirable. Jetter states, "The following criteria were adopted for the clinical diagnosis of acute alcoholic intoxication." These criteria are shown in his tables as follows: "Clinical Criteria Essential for Diagnosis of Clinical Intoxication," I. Patient must have a gross gait abnormality or be unable to walk. II. In addition to I., at least two of the following tests must be positive. 1. Gross abnormality of speech or inability to speak. 2. Flushed face. 3. Dilated pupils. 4. Alcoholic odor of breath.

In the detection of gait abnormalities, the individual was asked to walk from one side of the room to the other. If gross swaying, reeling or staggering were absent, the test was considered negative. For a detection of speech abnormality, the subject was required to answer simple questions only, such as his name, residence and so on. If definite slurring or incoherence were not present, the test was considered to be negative.

In the present experiment it was intended to study alcoholism at an even milder level than shown by these simple tests. Although each of Jetter's criteria was looked for in every case, it was found that dilation or fixation of the pupils occurred only in very marked degrees of alcoholism, and that testing for speech slips had to be done in a somewhat different manner. For this reason, a modification of Jetter's outline was undertaken. The term psychological impairment was used to indicate the degree of alcoholic intoxication occurring just before the appearance of the actual symptoms common to acute drunkenness such as coarse, thick speech, definite ataxia, staggering, vomiting, etc. This psychological impairment stage was then further subdivided into three categories: slight, moderate and marked. By slight psychological impairment, the writers mean that the individual, through the ingestion of alcohol, has reached a state wherein he is mildly euphoric, has a general sense of warmth and well-being, feels some slight thickening in the head without any dizziness, is perhaps overtalkative, and shows no somatic symptoms of any type except in some cases a transitory rise in pulse rate and/or respiration, a facial flush, and consciousness of having "had a drink."

A state of moderate impairment is indicated by an occasional slip in speech, slight gait abnormalities, and slight swaying in the Romberg test or with eyes blindfolded, in addition to those signs of slight impairment which have been described. In testing for speech impairment, the employment of phrases or specific questions is almost useless in the early stages. The individual under alcoholic intoxication invariably brings to bear a certain amount of unconscious or conscious effort, which will permit him to answer quite correctly and repeat question or test phrases without error until the degree of intoxication approaches a fairly high level.

A much better test of speech slips and errors is to give a short paragraph from any newspaper or magazine to the individual and request him to read it aloud. Here again, if the subject is asked only to read, he will be able in many cases to give the paragraph without verbal errors, but if requested to repeat its contents will be unable to do so. It was found at the moderate stage of impairment that if a person were asked to read a paragraph aloud, but to bear in mind that he would be required to recall its content, his concentration was broken up between attempting to remember what was read and attempting to make as good an impression as possible in the reading, with the result that any speech errors were magnified, and so made much more apparent. At the level of moderate impairment, the individual may be expected to make a few simple speech errors under reading conditions of this type, yet will be able to give all test phrases such as "round the rugged rock the ragged rascal ran;" "Methodist Episcopal;" "Third Riding Artillery Brigade;" "agricultural implements;" and "success to the successful thistle sifter," with ease.

In the testing of gait, it has been found that almost any individual, unless he is very markedly ataxic due to the action of the alcohol, will be able, though perhaps with effort, to walk a straight line or cross a room without obvious staggering. For the purpose of this examination, the subject was instructed to walk across the room into a narrow corner and there to turn about without stopping and to walk back again. Under slight impairment, no change whatever in gait is noticed. At the level of moderate impairment, the gait becomes on the "good behavior" type. The

person is somewhat stiff, stands more erect, walks with a slightly wider base and it can be easily seen that he is using some effort to direct his steps. He may deny this effort and actually be unaware of its presence; but if inquiry is made, he will state that he is conscious of his bodily movements; and this awareness of kinesthetic action indicates that the subject is approaching the state of moderate alcoholic psychological impairment. A moderately impaired person will walk in the manner described into the corner; but in turning, if he turns fairly rapidly and does not stop, will usually show some slight sidestepping, staggering, or mild unbalance; and this observation was used in determining the moderately impaired stage.

In addition, at this stage of impairment, a person will also subjectively in many cases feel some slight remoteness psychologically. This may be described as the state wherein the individual is somewhat abnormally aware of his own bodily sensations and, while aware of the physical nearness and normality of his surroundings, feels that he is able to view them, as it were, from a distance and that he is not actually a part of them. He will also feel some added mental effort of a slight degree over normal in working problems of arithmetic of a simple type. For this test the subtraction of 7 from 100 continued on down until the individual reaches the lowest whole answer, which is 2, was used. He will feel further that there is some slight retardation in his mental functioning. If the subject is euphoric at this point, he will probably neither admit to effort nor to retardation; but both of these factors are, however, in most cases, obvious upon examination. The individual, though not having a positive Romberg test, will show an increased amount of swaying and more difficulty in standing with the eyes closed or blindfolded than he did in the test as given before alcoholic ingestion.

The third stage, which is classified as marked or definite alcoholic psychological impairment, is that stage which just precedes the state of actual alcoholic intoxication to which Jetter's criteria apply, and which is well known to all clinical observers. In this stage, the individual will walk with a wide base and may be able to walk on a straight line except for the fact that he makes an occasional side step or shows some slight degree of instability. Jetter does

not mention the use of a sharp turn, or sudden reversal of direction which was found so useful in this test. Many persons observed during this experiment were able to walk without difficulty along a straight line, but in simply turning around and walking back, a large side step, definite swaying, or actual ataxia was noticed. At this stage any of these signs may be present. Further alcoholic intoxication from this point merely increases the degree of the symptoms until actual staggering becomes apparent. As regards speech, reading of the paragraph will produce more slips, and the speech will become slurred, slower, and harder to understand. Test phrases, however, even those more difficult to pronounce, are usually given with facility, although the subject may make an occasional error. The eyes at this point will show normal pupillary reactions, but the cornea usually will be somewhat injected and have a sort of glassy fixed appearance characteristic of this stage of intoxication. The Romberg swaying at this point becomes more marked and may even become definitely positive. Pointing tests, however, seem to be of little value, as the individual usually can control this type of movement at this stage. Somatic symptoms usually may occur at this point or somewhat before in certain cases and consist of a feeling of numbness or dullness in the finger tips, about the mouth and around the eyes, and may include a heaviness of the eyelids. Other somatic symptoms do not usually occur, except perhaps an occasional transitory nausea. Subjective symptoms at this level include an increase in the feeling of remoteness, a definite sense of effort in both spoken and active performances, and some increased feelings of retardation. This state is best described to most of us as the state which an individual achieves at a pre-dinner cocktail party when following a number of drinks he is able to walk and talk fairly well and is socially acceptable, yet, when he sits down to dinner, sits down with considerable caution so that he will not knock the glassware off the table. In this state of definite marked psychological impairment, the individual, however, may or may not actually show any marked ataxia. The important point is that he is quite aware of the possibility of making errors in speech and movements and still has enough mental faculties left to try, at least, to prevent any catastrophe.

Further alcoholic intoxication beyond this stage of marked impairment will so occlude the subject's use of his normal mental functions that the individual ceases either to care what he does or else is unable to control his motor actions to a point where accidents are likely to happen. Up to this stage, an individual may be considered moderately safe in handling himself and in performing fairly complex mental tasks, although in all of these problems there will be some definite mental retardation; and extra effort will be needed. Beyond this stage there is no doubt that the individual is unable to perform any type of task requiring complex mental or physical action. For this experiment, it was desirable to study the subjects at the level just before this marked state, and so it was necessary to bring our subjects to a state of clinical alcoholic intoxication corresponding to the moderate level of psychological impairment or to a point lying approximately between this level and marked impairment. This latter state is designated moderate plus (mod.+).

In general the signs and symptoms to be observed were listed as follows, and each subject was checked before any alcohol was given and then at intervals throughout the experiment as specified in the procedure given in another section. As can be seen from the list, Jetter's criteria were looked for and listed with the modifications just outlined.

Clinical Criteria

1.   Gross gait abnormality.

2.   Two of the following objective symptoms: (a) abnormality of speech, (b) flushed face, (c) dilated pupils, (d) alcoholic breath.

3.   Somatic symptoms: (a) paresthesias, (b) anesthesias (c) nausea, (d) vertigo, (e) palpitation, (f) pain, (g) drowsiness.

4.   Subjective symptoms: (a) overtalkativeness, (b) mild euphoria, (c) retarded reaction, (d) feelings of remoteness, (e) necessity of extra effort to prevent slips in speech and performance.

THE ESTIMATION OF THE BLOOD ALCOHOL LEVEL*

In looking for a method for the simple determination of ethyl alcohol in the blood it was felt that its primary requisite should be

that it be simple enough for the average practising physician or psychiatrist to utilize in his office or in a small hospital laboratory. For this reason the long technique of Widmark[4] was ruled out. After surveying a number of methods, it was felt that the technique of Abel[5] was probably the best for the purpose. In brief, Abel's principle is to absorb the alcohol from blood caught on a roll of filter paper into a solution of potassium dichromate in concentrated sulphuric acid. This solution is reduced and a green or blue color is developed which is compared with a standard solution, made from known amounts of alcohol, in a comparator block. The reagent used is a solution of 0.33 per cent potassium dichromate in sulphuric acid (made by dissolving 333 mg. dichromate in 1 cc. of water and diluting to 100 cc. with concentrated sulphuric acid). The standards were made by diluting known quantities of alcohol in a solution with distilled water and 1 cc. of the dichromate sulphuric acid solution to a total of 3 cc. volume. For the purposes of this experiment—inasmuch as they keep for only two weeks—the standards were made up from prepared stock solutions of known amounts of alcohol, set up so that 1 cc. of each known alcoholic solution, 1 cc. of water and 1 cc. of the dichromate sulphuric acid solution would be used. The stock solutions were made as follows: First a basic stock solution was made to have 1 mg. ethyl alcohol by weight per cc. of water. This was done by weighing 100 mg. of ethyl alcohol into a volumetric flask and diluting to 100 cc. with doubly distilled water. From the stock solution other dilutions were prepared as shown in the following table. All the dilutions in the table were made up with the exception of the two concentrations 0.15 and 0.20. These two standards can be prepared as shown in the table by dilution from the bottle containing 0.1 mg. alcohol per cc. All other standards required exactly 1 cc. of the given solution plus 1 cc. of water and 1 cc. of dichromate sulphuric acid.

The actual determination for alcohol in the blood was carried out as follows, exactly according to the method indicated by Abel.

One cc. of 0.33 per cent potassium dichromate solution in sulphuric acid (made by dissolving 333 mg. dichromate in 1 cc. of water, and diluting to 100 cc. with concentrated sulphuric acid) is spread on the bottom of a 50 cc. Erlenmeyer flask. Then, 0.6 cc.

of blood are pipetted onto a roll of filter paper prepared according to Abel's method. The long strip of paper left attached to the roll is inserted between the cork and neck of the flask, thus allowing the absorbed blood to be suspended over the dichromate solution. After being heated from 15 to 30 minutes in a boiling water bath or drying oven at 100° C., the flask is cooled, the cork and wad of paper are removed, and 1.7 cc. of water are added, bringing the total volume of the contents to 3.0 cc. (1 cc. dichromate solution, close to 0.3 cc. water from the dessicated blood and, now, 1.7 cc. water.) The diluted solution is poured into a test tube (6"x½") and its color finally compared with the standard set in a comparator block.

BASIC STOCK SOLUTION 1.0 MG. ETHYL ALCOHOL PER 1.0 CC.

Stock solutions, alcohol per cc.	To prepare
0.05	5 cc. of 1.0 solution in 100 cc. water
0.10	10 cc. of 1.0 solution in 100 cc. water
0.15 not made as stock	1.5 cc. of 0.10 solution direct in standard
0.20 solution	2.0 cc. of 0.10 solution direct in standard
0.25	5 cc. of 0.5 solution to 10 cc. water
0.30	6 cc. of 0.5 solution to 10 cc. water
0.35	7 cc. of 0.5 solution to 10 cc. water
0.40	8 cc. of 0.5 solution to 10 cc. water
0.45	9 cc. of 0.5 solution to 10 cc. water
0.50	50 cc. of 1.0 solution in 100 cc. water
0.55	5.5 cc. of 1.0 solution in 10 cc. water
0.60	6 cc. of 1.0 solution in 10 cc. water
0.65	6.5 cc. of 1.0 solution in 10 cc. water
0.70	7 cc. of 1.0 solution in 10 cc. water

A number of trial runs were made using water with known alcoholic content; and recoveries were obtained within a few hundredths of a milligram. In this method, with comparator standards, such errors are permissible for general clinical use. Determinations were also made, using standard filter paper in the laboratory and blood taken from a number of persons, and using varying amounts of oxalate in the blood. None of these determinations showed any reduction whatsoever of the dichromate solution. The method therefore was considered accurate enough for clinical use, simple enough for use by the average physician, rapid enough to be of value in accurate clinical estimations of the alcohol content

of the blood in practice; and for these reasons it has been adopted
for use in this type of clinical problem.

THE NAGLE ALCOHOL SUSCEPTIBILITY TEST

In the original technique, this test was described as follows:
"0.03 cc. of ethyl alcohol U. S. P., 95 per cent is injected intra-
dermally into the lateral aspect of the deltoid region. An equal
amount of physiological saline is injected in a like manner into the
other arm as a control. No skin antiseptic is used." Recently
Nagle has modified his technique so that he now uses the method as
above, but employs an alcoholic injection of a 60-40 solution of 95
per cent alcohol U. S. P. and distilled water, to prevent the occa-
sional scab formation which occurred with the stronger solution.
This modification of the method, using 60 per cent alcohol injected
as given above, was used in this study, and all of the readings were
done at exactly 25 minutes.

Nagle further states that a wheal formation is noticed following
every such injection, variation in its size being from 0.60 cm. to
1.70 cm. However, in most cases, a circumscribed zone of inflam-
mation appears about the wheal. The erythema serves as a basis
for the clinical interpretation of the test. The redness, when pres-
ent, may vary in degree of intensity and area; but it is the degree
of redness which is of primary importance, for it is upon this find-
ing that the classification of results is recorded. Nagle attached
but little significance to the diameter of the redness. In working
with the test, the writers found his conclusion true in general, but
also found that some degree of correlation could be set up with the
size of the redness of the wheal, as well as with the degree of red-
ness. These impressions have been further supported by the ex-
periment; and the measurements of the skin tests are at some va-
riance with Nagle's original findings, as Nagle found no redness in
his immune reading, and found smaller measurable red areas in the
other groups. In this experiment, all individuals were found to
have wheals of about the same size; and it seemed better to meas-
ure the total red area, as previously noted.

Nagle, following Tufts,[6] found several gradations of reactions
varying from "marked reactions following an intradermal skin
test" which he labeled marked (++++) down through moder-

ate (+++), mild (++), slight (+), very slight (±), immune (0) reaction. According to Nagle, an immune (0) reaction showed no redness surrounding the wheal; and the person displaying this reaction was considered to possess maximum tolerance for alcoholic beverages. The table shows Nagle's analysis of 100 skin tests in his control series giving the average sizes of the wheals and red areas for the various readings, together with an estimation of the amount of absolute alcohol necessary to produce a level of psychological impairment comparable to the moderate to marked level already described, if taken on an empty stomach.[2]

ANALYSIS 100 SKIN TESTS—75 Males, 25 Females

Reading	No.	Average size wheal	Average size redness	Per cent	Expected alc. capacity
Immune 0	18	1.1 cm.	.0 cm.	18	75 cc.
Very slight ± ...	15	1.2 cm.	2.3 cm.	15	60 cc.
Slight + ...	29	1.3 cm.	2.8 cm.	29	45 cc.
Mild ++	10	1.3 cm.	3.3 cm.	10	30 cc.
Moderate +++.	15	1.2 cm.	3.3 cm.	15	15 cc.
Marked ++++.	13	1.3 cm.	4.0 cm.	13	7.5 cc.

Nagle further correlated his work with that of Sachsenberg[7] in Germany. Sachsenberg, working at the Polytechnic Institute of the College of Technology at Dresden, attempted to determine how great an alcohol content of the blood would produce physical impairment incompatible with the safe direction of a motor vehicle. Such an impairment was assumed if the driver in question, while under the influence of alcohol, were observed to drive more recklessly than 90 per cent of all normal drivers. In the accompanying table are set forth his percentages of persons adjudged incapable of driving safely after taking alcohol and the corresponding alcohol values of the blood which rendered them unfit. In addition Nagle[8] has listed approximately the corresponding readings which occur to him to be estimable for these various blood levels.

In this work it was found that these levels did not come out exactly as predicted by Nagle; but the susceptibility test, as developed to this point, was sufficient to give a clue as to how much alco-

hol would be needed to induce a given level of alcoholic intoxication.

Nagle's levels	Alcoholic content of blood per 1,000	Drivers incapacitated, per cent
Marked (++++)	0.2	20
Moderate (+++)	0.4	40
Mild (++)	0.5	49
		(About 2½ small bottles of beer)
	0.6	58
Slight (+)	0.7	66
	0.8	75
	0.9	80.5
Very slight (±)	1.0	87.5
	1.1	90
	1.2	93
Immune (0)	1.3	96
	1.4	100
		(About 2 bottles of moderately heavy Rhine wine)

For the purpose of the present experiment, some modification of the readings of the reaction was undertaken; and values for the readings and alcoholic capacity expectancy were set up as follows. No attention was paid to the wheal formation or its size, which was almost constant in every case. Instead, the two largest diameters, horizontal and vertical, of the red areas resulting from the alcohol injection were measured and added. Then the area of redness, if any, or the size of the wheal, if any, resulting from the saline injection was measured along similar diameters and the sum of these subtracted from the sum of the cross diameters of the alcoholicly-produced red area. If, for example, the redness produced by the alcohol injection was 3 cm. by 5 cm. and the redness resulting from the saline injection was found to be 2 cm. by 3 cm., the extra redness due to the alcohol would be $(3+5)-(2+3)=3$ cm.

These values were then arranged, as shown below, and used equally with the degree of irritation as measured by the intensity of reddening reaction to give a more objective method of estimation as follows:

SKIN READING

Cm. redness due to alcohol	Redness	Reading	Expected dose of abs. alc. to reach mod. impairment
2	very slight pink or absent	Immune (0)	75 cc.
2.1—3.0	slight red	v. slight (±)	60 cc.
3.1—4.0	definite red color with few red pseudopods	slight (+)	45 cc.
4.1—5.0	red and warm with pseudopods	mild (++)	30 cc.
5.1—6.0	bright red and hot with pseudopods	moderate (+++)	15 cc.
6	marked inflamatory reaction	marked (++++)	7.5 cc.

EXPERIMENTAL PROCEDURE

To carry out the actual experiment, utilizing the three techniques enumerated above, the following routine was employed.

1. Skin test made. 2. Alcoholic history of the subject recorded. 3. Performance on "symptoms" checked. 4. Skin test read at 25 minutes. 5. Alcohol administered. 6. Symptoms checked at 10, 20, 30, 40 minutes. 7. Blood alcohol tested at 40 minutes. 8. Second blood alcohol test made. 9. Somatic and residual symptoms checked.

Subjects were selected from volunteers, who were workers in the New York State Psychiatric Institute and Hospital. All were in about the same intellectual bracket.

In the actual working of the experiment, each subject was brought into the examining room, usually about 9:00 in the morning, and a skin test was given immediately. The subject had prepared for the examination by abstaining from alcoholic beverages during the preceding 24 hours and by not taking anything by mouth since 12:00 midnight. The reason for this was to make sure that the subject would be in, as far as it could be controlled, an absolute "basal" condition, as regards his gastrointestinal tract, so that the absorption rate of the alcohol would not be affected by the presence of food or other content in the stomach and intestine. This, naturally, was most important, because the work of Himwich[9] and others has shown that the presence of food of any kind in the digestive tract decreases the rate of absorption and that all foods

do not do this to the same degree. Fatty foods, such as milk, cream and butter, are more effective than other types in exerting an inhibiting effect on the absorption of alcohol. In the skin test the alcohol injection was always given on the right arm and the saline on the left, according to the technique described previously.

Next, the symptoms, as given in the outline above, were checked so that the subject's performance abilities in each clinical test without alcohol should be known; and a history of his alcoholic consumption and social reactions was taken.

At 25 minutes, the skin test readings were made. Nagle indicated that the best time for the reading was somewhere between 20 and 30 minutes. It was felt that 25 minutes was a good median; and previous experiments had showed that the readings at 20, 25, or 30 minutes are essentially similar.

Next, the estimated dose of alcohol was given. The alcoholic dosage was computed from the skin test evaluated as noted in the table previously given. The alcohol was given in the form of absolute 100 per cent U. S. P. alcohol diluted with an equal amount of grape juice. The work of Miles[10] has shown that the manner of dilution and its relationship to absorption is important. Miles' experiment shows that the measured toxic effects, which were demonstrable for more dilute doses, were definitely stronger when the same amount of alcohol was taken in a more concentrated form.

To estimate easily capacities equivalent to social tolerances, the dosage should be made equivalent in concentration to the alcoholic content of straight, hard liquors such as rye, or bourbon which usually run approximately 80 to 100 proof or 40 to 50 per cent. The dosage was calculated from the skin test reading, and an attempt was made to use a quantity of alcohol which would get the subject into, or just slightly above, the moderate level. Therefore the dose varied with each individual, dependent upon the skin reaction, and in most cases the desired level was almost exactly reached.

Grape juice was used as a diluting medium because it is the tastiest type of mix for use under these conditions. Alcoholic concentrations of over 50 per cent of course are hardly feasible because they are not potable. The mixture was taken orally and in one sustained swallow. All subjects were able to take the given dose without any effect other than slight coughing.

Following the ingestion of the alcohol, the subjects' reactions were checked against the symptom chart at intervals of 10, 20, 30, and 40 minutes. Each symptom was checked at these periods; and in addition, at the 30-minute level, when impairment most frequently became observable, special tests, such as the reading of additional paragraphs or the working of simple mathematical problems, were introduced.

At 40 minutes, immediately following the clinical test routine, a first blood alcohol specimen was taken. The blood alcohol was taken at this particular time, because the work of Miles showed that in concentrated doses approximately the peak of the alcoholic level was reached at about this period. There is a stage at which the blood content will for a time remain about stationary at the high level it has reached; and preliminary experiments showed that this stage was usually reached with a given dosage in 50 per cent dilution at about 40 minutes. This stage is called the "Grehaut plateau," and it was desired that each subject be checked by means of blood alcohol studies while he was as nearly as possible at this peak of effect. This level usually represents the period of most toxic effects and observable psychological symptoms. The more acute clinical signs occur during the early parts of the plateau.

The blood for use in the determination of alcoholic content was taken from the veins of the antecubital fossa; and while skin sterilization was done, using alcohol, every precaution was taken to see that the skin was wiped dry, and that there was no alcohol upon it which could contaminate or affect the final reading. All blood determinations were taken and run in duplicate.

Other psychiatric tests were then made, after which clinical behavior estimations and check of symptoms were made, following which the second blood alcohol was taken in exactly the same manner as the first. A final check on the somatic and residual symptoms was then made, and the experiment was considered terminated.

RESULTS

In summarizing the results of the skin tests and the relationship of alcoholic intoxication to the blood level in tabular form, the subjects were arranged in descending order, beginning with those having the most immune skin reactions and the least susceptibility, go-

TABLE 1

Subject	Weight	Sex	Cm.	Skin test Reading	Dose	Alcohol I. Time	Mg. per cc.	Alcohol II. Time	Mg. per cc.	Impairment I.	Impairment II.	Alcohol Average intake
1	116	F.	2.0	Immune (0)	75 cc.	40	0.85	70	1.20	Slight	Moderate	Mod.
2	200	M.	2.0	Immune	60 cc.	40	0.70	60	0.80	Slight	Slight	Mod.
3	130	M.	2.8	Very slight (±)	45 cc.	40	0.60	80	0.80	Slight	Moderate	Mod.
4	130	M.	3.0	Very slight	60 cc.	40	0.70	90	1.00	Slight	Moderate	Mod.
5	112	F.	2.0	Very slight	60 cc.	40	1.10	80	1.10	Mod. +	Moderate +	Mod. +
6	118	F.	2.5	Very slight	60 cc.	40	0.90	70	1.40	Mod.	Moderate +	Occ.
7	170	M.	3.0	Very slight	60 cc.	40	0.40	80	0.80	Slight	Moderate	Mod. +
8	110	F.	3.0	Very slight	45 cc.	50	0.80	90	0.80	Mod.	Moderate	Mod.
9	110	F.	2.5	Very slight	75 cc.	..	...	60	1.40	Mod. + (and marked at 80 m.)		Mod.
10	139	F.	4.0	Slight (+)	45 cc.	40	0.60	80	0.70	Mod.	Moderate	Mod.
11	143	M.	3.5	Slight	45 cc.	40	0.70	70	0.70	Mod.	Moderate	Occ.
12	150	M.	4.0	Slight	45 cc.	40	0.60	60	0.65	Mod.	Moderate	Mod.
13	125	M.	4.0	Slight	45 cc.	40	0.60	80	0.80	Mod.	Moderate +	Mod.
14	148	M.	4.5	Slight	45 cc.	40	0.70	60	0.80	Mod.	Moderate	Mod.
15	120	F.	3.5	Slight	45 cc.	40	0.80	70	0.90	Mod. +	Moderate +	Occ.
16	150	M.	4.0	Slight	45 cc.	40	0.60	90	0.65	Mod.	Moderate	Mod.
17	125	F.	4.0	Mild (++)	30 cc.	40	0.60	70	0.60	Mod. +	Moderate +	Mod.
18	120	F.	4.5	Mild	60 cc.	40	0.90	60	1.10	Marked	Marked	Occ.
19	129	F.	5.5	Moderate (+++)	15 cc.	40	0.25	70	0.25	Mod.	Moderate	Occ.

ing down to those showing the highest susceptibility and the largest skin reaction. The cases used constituted 17 subjects and two repeat cases, the results of which are summarized in Table 1.

In this table the figures under "skin test" show the amount of redness in centimeters and the reading as interpreted. Under "alcohol" are found two columns, I and II being the blood alcohol levels in tenths of milligrams of alcohol per cc. of blood; I, being the first blood determination and II, the second. The figures before this amount indicate the exact period of elapsed time in minutes from the oral ingestion of the alcohol until the specimen was taken. In the impairment column, the impairment degrees are marked with the corresponding blood alcohol level of the preceding column. The last column indicates the subjects' customary alcoholic habits, "occ." (occasionally) indicating that only a rare or occasional drink is taken and "mod." (moderate) indicating that the subject either takes a fairly large dose once or twice a week or else takes a small daily dose. "Marked" would indicate a large daily dose as for example six to eight oz. of whiskey (100 proof) daily or a pint or two of wine or a quart or two of beer a day. There were no drinkers of this type in the series. The highest intake in one case was about two oz. of wine daily; in another, a pint or so of beer daily; and in several others an average of four or five cocktails a week.

While the results of this experiment cannot be considered as final, in view of the fact that such a small number of subjects was studied, the preliminary findings on this group correlate remarkably with the findings of Sachsenberg as regards the variability of blood alcohol level in intoxication and the findings of Nagle in regard to the skin test.

Analysis of the table shows that in the first case, No. 1, with a skin reading of Immune (0) was able to handle 75 cc. absolute alcohol with only slight clinical impairment and a blood alcohol level of 0.85 mg. alcohol per cc. of blood and moderate clinical impairment at a level of 1.20 mg. alcohol per cc. of blood.

In the case of No. 2, only 60 cc. of alcohol were given, although the skin test was the same, because the subject had had a gastrointestinal upset the night before. As a result of this lower dose, his blood concentration reached a level of only 0.80 mg. alcohol per cc. of blood; and he was only slightly impaired psychologically.

From this, it may be estimated that a blood level of 0.80 mg. of alcohol per cc. of blood in these individuals gives slight impairment and one of about 1.20 mg. of alcohol per cc. of blood, moderate impairment. Absorption was probably cut down in No. 2 also, because of the ingestion of charcoal the day previously; and his weight must also be considered in relation to that of No. 1. Both individuals were average, moderate drinkers.

In the second group of cases, all gave essentially the same skin reaction but showed some diversification in absorption rate and final level reached. In all of the cases, regardless of the initial dose, at a blood level of 0.60 mg. of alcohol per cc. of blood, the impairment was only slight but at 0.80 mg. to 1.00 mg. of alcohol per cc. of blood it was moderate. Over 1.00 mg. alcohol per cc. blood, when it occurred, produced an increase of symptoms tending toward marked. Two of these individuals developed levels of 1.40 mg. of alcohol per cc. of blood at which time they showed marked symptoms and were markedly more intoxicated than case 1 at a level of 1.20 mg. of alcohol per cc. of blood. The doses were varied in some cases to produce different blood alcohol levels. In the case of No. 7, food was permitted, so that its effect on the absorption rate could be determined—as expected, this was slowed down—and so that a lower blood level could be reached with an equal amount of alcoholic intake.

From these findings, it is possible to conclude that in cases of very slight readings ($\pm$), slight impairment is found at the level of 0.60 to 0.70 mg. alcohol per cc. of blood, moderate impairment at the level of 0.80 to 1.00 mg. alcohol per cc. of blood, with increasing impairment through 1.40 mg. of alcohol per cc. of blood—when impairment tends to become marked.

In the third group, there were seven subjects all of whom received 45 cc. of absolute alcohol and in all of whom a blood level of 0.60 mg. or 0.70 mg. of alcohol per cc. of blood produced moderate symptoms. In this group, two individuals having a level of 0.80 or 0.90 mg. of alcohol per cc. of blood showed a considerable increase in the symptomatology over moderate impairment, though one other, No. 14, taken at the level of 0.80 mg. of alcohol per cc. of blood was definitely still in the moderate impairment state.

We may assume from this that an individual having a skin read-

ing of slight degree (+) will show moderate effects at 0.60 mg. of alcohol per cc. of blood, increasing effects at 0.80 mg. of alcohol per cc. of blood, and marked impairment above levels of 0.90 mg. alcohol per cc. of blood.

In the next grouping, where the skin test was mild (++), one subject at the level of 0.60 mg. of alcohol per cc. of blood was somewhat more than moderately impaired; and the other, at the level of 0.90 mg. of alcohol per cc. of blood was markedly enough impaired to be adjudged clinically intoxicated by any standard. In this group, we may assume then that blood alcohol levels of 0.60 mg. of alcohol per cc. of blood give somewhat more than moderate impairment and that at 0.90 mg. of alcohol per cc. of blood, marked impairment may be expected.

In the last grouping, the one case of moderate reading (+++) showed a blood level of 0.25 mg. of alcohol per cc. of blood and a moderate impairment, from which it may be concluded that approximately this level gives moderate impairment and that an increase in the blood alcohol level of 0.2 mg. of alcohol per cc. of blood or so, above this would produce a marked degree of impairment.

These expectations while highly tentative, as they are based on such a small sample of material, are given in Table 2.

TABLE 2

Cm. of irritation	Skin Redness	Reading	Dose	Blood alcohol, level expected at 40 min.	Psychological effect
2	Very slight pink or absent	0	75 cc.	0.80	Slight
2.1-3.0	Slight red	±	60 cc.	0.70	Slight
			60 cc.	0.80-1.00	Moderate
			60 cc.	over 1.40	Marked
3.1-4.0	Definite red color with few red pseudopods	+1	45 cc.	0.60	Moderate
			45 cc.	0.80	Moderate+
			45 cc.	over 1.00	Marked
4.1-5.0	Red and warm with pseudopods	+2	30 cc.	0.60	Moderate+
			30 cc.	0.90	Marked
5.1-6.0	Bright red and hot with pseudopods	+3	15 cc.	0.2 to 0.30	Moderate
6+		+4	7.6 cc.	approx 0.1	Moderate (approximated)

DISCUSSION

From these 19 cases, it can be seen that the subjects show a considerable degree of variability in the level of the blood alcohol when the same clinical status of moderate impairment is reached. There are cases which show moderate impairment at a blood alcohol level of 0.25, 0.60, 0.80, 1.00, and 0.25 mg. alcohol per cc. of blood, which is in complete accordance with Sachsenberg's findings.[7] In these same subjects, one finds a correlation also of the skin reading, the blood level and the degree of impairment in that those individuals having the smallest skin reaction show moderate clinical impairment with the highest blood alcohol level, and those having the largest skin reaction show the same clinical impairment with a much smaller amount of alcohol in the blood. For this reason, speculation is possible, even with so small a group, on the assumption that there is a definite relationship between the skin tolerance of a given individual and the degree of psychological impairment which he will show at a given level of blood alcohol. This is quite in accordance with the findings of other workers and explains why the use of the blood alcohol level alone cannot be considered an accurate method of determining a clinical diagnosis of drunkenness.

Sollmann[11] has pointed out that the usual critical concentration for the chemical diagnosis of drunkenness is an alcohol level at 0.15 per cent of the blood, and has compiled a table to show the usual correlations of alcohol content of the blood with clinical symptoms. This table, however, does not show the individual variations occurring at similar blood alcohol levels. Also, this compilation has, as have almost all of the other studies, emphasized higher alcoholic ranges; and critical concentrations are usually considered at about a level of 1.5 mg. alcohol per cc. of blood. This corresponds roughly to the imbibition of 150 cc. of alcohol or about a pint of whiskey or 10 bottles of beer at one drink; and unfortunately almost every subject at this level will have obviously reached a state considerably beyond marked psychological impairment.

The findings of this experiment that the symptomatology of alcohol varies both with the blood level and the individual susceptibility indicate a need for a different approach to the classification of re-

sults. Tables, such as prepared by Miles,[10] can hardly be considered of real clinical value, inasmuch as they are mere generalizations of observed facts. His particular chart was checked for symptomatology during the course of these experiments, but except for the first two levels of symptoms, almost none of them could be corroborated. Miles, of course, did his work under "social conditions," and it must be borne in mind that an experiment done within the confines of a laboratory will cut down markedly the number and appearance of such symptoms as Miles listed.

Furthermore, the 19 cases in this experiment show definite impairment effects at a considerably lower level than indicated by Miles or by Bogen[12] who found the subclinical stage to occur at less than 1 mg. of alcohol per cc. of blood, the stage of stimulation to occur at between 1 and 2 mg. of alcohol per cc. of blood, the stage of confusion at 3 mg. of alcohol per cc. of blood and stupor at 4 mg. of alcohol per cc. of blood. Two of the writers' cases showed confusion and stupor at levels of 1.10 and 1.40 mg. of alcohol per cc. of blood; and many were considerably affected at a level far below 1.0 mg. of alcohol per cc. of blood.

It is felt, therefore, that such tabular charts or estimates of symptomatological levels are of little practical value, unless they are used with the results of susceptibility tests and unless each subjective and objective symptomatological rating is separately presented for each susceptibility reaction group.

From a medico-legal point of view the findings in these cases are of considerable interest; for, as has been indicated previously, almost none of the clinical observations reported in the literature considered a diagnosis of alcoholic intoxication definite until the subject was beyond the stage of marked psychological impairment.

From this work, it is suggested that impairment of rapid and clear mental function occurs somewhat before this stage has been reached. From Table 2, certain blood levels, varying with the susceptibility grouping, can be assumed to produce the equivalent of the marked psychological impairment mental state. It could, therefore, be assumed that in persons suspected of alcoholic intoxication —providing, of course, that definite basic figures could be worked out on large numbers of cases—the impairment levels could be estimated accurately, simply by using the skin test and having a

blood alcohol evaluation simultaneously taken. As soon as an alcoholic susceptibility grouping was determined, it would be an easy matter to compare the blood alcohol level obtained with the level calculated to show marked impairment. If the alcohol present in the blood were at or over this level, the subject would be considered psychologically impaired, even though, through habituation and practice, effort or temporary emotional stimulation, he were able to conceal the grosser clinical indications of this state during the course of the average clinical examination.

This estimate would be in accord with the Pennsylvania court dictum quoted by Bogen[13] in the case of Elkin vs. Buschner, 16 Atl. 102-104, ''where it was held that although a man may walk straight, attend to business and give no outward and visible signs of intoxication, yet if he is so affected by alcohol as to be excited, or not to possess that clearness of intellect which he would otherwise possess, he is suffering from acute alcoholism.''

It would seem that in cases involving automobile accidents in particular, this court's view that an individual may be moderately impaired and be a definite hazard both to himself and others on the road without presenting the entire common syndrome of drunkenness, is—if sustained by pharmacopsychological methods—of more practical value than the holdings of courts of other states which, for example, cannot consider a man to be intoxicated unless it be shown that he has ''lost either the control of the faculties—or of the muscles of locomotion.'' Indeed the danger from the latter type of person, where the individual, in many instances, will be unable, by reason of his incoordination even to attempt to drive, is nowhere nearly so great as from those individuals who are psychologically impaired, but in whom the concomitant euphoria not only precludes their awareness of the fact but even spurs them on to more reckless actions.

In concluding the discussion of the experiment, some of the apparent problems raised by the work should be pointed out. As Nagle indicates, only ''a simple test for alcoholic intolerance is supplied; the factor needed to fill out our knowledge is an understanding of the nature of the phenomenon causing that intolerance.''

The skin test seems to be a measure of individual susceptibility based on the reaction of the skin, at the site of the injection, to an

irritant—ethyl alcohol. Immediately, the question that arises is whether individual differences in tolerance can be explained at least in part by variations of this reaction. Manwaring, in discussing Nagle's paper, pointed out that pharmacologists in most instances have explained such apparent differences as mainly due to different rates of absorption from the gastrointestinal tract. Schweisheimer emphasized this factor in explaining acquired tolerance; and Bogen agreed and also added that in some individuals there is an "increased oxidation of the alcohol absorbed, but that the tissues are always affected to about the same degree by the same concentration of alcohol in the blood, irrespective of the previous habits of the individual or the total amount of alcohol drunk."

The findings of the experiment, as already explained, are certainly at variance with these statements but are in accordance with those of Bowman,[14] who writes: "It must again be emphasized how differently, different individuals react to alcohol, and while statistical averages are possible one can never tell what the reactions of any particular individual will be to a given dose of alcohol." He further states: "Many recent writers have assumed that tolerance to alcohol is acquired by some unknown physiological process which prevents as high concentration of alcohol in the blood in the habitual drinker as in the teetotaler. Certain figures have been published to demonstrate this. However, recent work by Flemming and Stotz[15] does not confirm this and it is felt that the explanation of acquired tolerance to alcohol is not understood. Doubtless, a certain factor is psychological in that the individual becomes used to the effects of alcohol and knows how to manage himself in spite of the toxic effect of the drug. However, continued indulgence often results in decreased tolerance and pathological intoxication sometimes arises on this basis."

Flemming,[16] in his discussion, recognized two types of drinkers. The first he characterized as manifesting symptomatic alcoholism and the second as true alcoholic addiction. In his first type, the alcohol is taken for the pharmacological effect in relieving symptoms due to an underlying, though not necessarily related, psychopathological condition. His second type is associated with real habituation; and it was found that type one leads, in seven to 10

years of heavy drinking, to type two in which a specific craving for the drug characterizes the individual.

The findings of Bowman and Flemming are of special interest, as the work of Silkworth[17] may offer a tentative hypothesis to explain the development of this increasing craving or increasing alcoholic susceptibility in chronic drinkers. Silkworth feels that true alcoholism is an allergic state and results from a gradually increasing sensitization to alcohol over a more or less extended period of time, though some cases may be allergic from birth. He quotes Prof. Beechold of Leipzig University in his textbook on "Colloids in Biology and Medicine," as stating, "Some day, chronic alcoholism may possibly receive a physicochemical explanation from the changes in the condition of the body colloids."

Such an hypothesis of alcoholism, as an allergic condition resulting from a physiological sensitization, would help to explain individual differences in alcoholic susceptibility on a basis of varying inherent sensitivity and would account to some degree for tolerance changes and increasing susceptibility with prolonged indulgence. Furthermore, it would serve as a basis for better understanding of the mechanism of the alcoholic susceptibility test.

It is utterly impossible at this time, of course, even to hypothesize upon the mechanisms involved in the skin reaction or to indicate whether they are mere irritative responses or are actual allergic skin reactions. The problem is highly complicated— particularly so because alcohol is not a protein; and unknown intermediate reactions must be postulated before a reactivity in the true allergic sense can be considered. In addition, it is not known whether this skin test is a qualitative or quantitative measure of the susceptibility of other organs and tissues of the body. Experiments on animals and extensive clinical studies will be required to clear up these points.

In general, it can be said that the present experimental work, while confirming the clinical findings of Nagle, Sachsenberg and Bowman, serves only to indicate further important avenues of work in physiological, pharmacological and biochemical fields, which should be extensively investigated before the hypothesis promulgated can be considered as an acceptable working thesis in the field of alcoholic intoxication. The results obtained so far, however, do

agree with clinical data; and in spite of the small number of cases studied to date, it is felt that this preliminary report should be presented in detail, in order to suggest broader avenues of approach to other workers trying to solve the multifarious physiological and omniform psychological reactions resulting from the ingestion of ethyl alcohol.

SUMMARY

Nineteen cases of experimental alcoholism are reported; and simultaneous studies of the psychological intoxication level, the alcohol susceptibility skin test and blood alcohol levels are detailed.

Marked correlation is found among these three factors; and this tends to validate by an experimental technique Nagle's claims for the alcohol susceptibility test.

A scale of interpretation evaluations for the skin test reaction is given, together with modifications of Nagle's interpretive valuations.

Theoretical bases for the test are discussed and further necessary avenues of research and study of the susceptibility test are suggested.

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ON BLUSHING*

BY SANDOR FELDMAN, M. D.

I

In 1922, in the *Internationale Zeitschrift für Psychoanalyse,* the writer published a paper about blushing. At that time, on the basis of many observations and especially on the basis of a deep analysis of one (published) case the following statements were made:

1. Blushing is a libidinous excitement of the skin.

2. Blushing is a sudden displacement from below upwards of a genital excitement which was repressed by the fear of castration.

3. Blushing is a conspicuous sign of an unsettled castration complex.

4. Blushing in women is also a sign of castration fear. Women suffer from a permanent condition of being castrated.

5. Men are ashamed and blush because they feel that they are castrated.

6. Women are ashamed and blush for not being men.

7. Blushing is an exhibitionistic act. It is the exposure of the genital excitement on the face and aims to notify another person of its erotic significance.

Benedek has published a further contribution to this problem;[1] and Bien of Vienna in a book about blushing[2] emphasized that the fear of blushing as a clinical phenomenon is more in the foreground than the blushing itself. The writer's efforts to investigate this problem further, to obtain deeper insight and perhaps increased ability to give relief for this dreaded symptom were unsuccessful until Hermann in Budapest called attention to some of the biological and social aspects of psychoanalytical problems, without forgetting the libidinous conflicts in any neurosis. (This fact must be emphasized to avoid misunderstanding.)

Before proceding, it would be well to review briefly the clinical picture of the symptomatology of blushing.

II

1. It is surprising that more men blush than women.

2. If blushing appears as a definite symptom of a neurosis, men suffer more comparatively than women do.

3. Blushing can never be observed until the child reaches the genital phase of his libido-development. Blushing appears at the age of three to six, regardless of sex.

4. Blushing ordinarily appears only in the presence of other persons. It might appear when alone if the patient forgot that he were alone. Its appearance can be postponed for a short time.

5. The face in blushing is the only visible organ to show the explicit signs of a local libidinous excitement: redness, heat, swelling, secretion, i. e., sweating, increased cardiac activity such as is observed in the genitals and during genital excitement.

6. Blushing is always and without exception associated with the feeling of shame, but one can shame himself without blushing.

7. As a practical matter, shame is more often extrasexual than sexual. Shame and blushing are observed in sexually colored situations or in situations connected with them, but very often there is no reason to assume an actual basic or primary sexual component.

8. Practically, blushing is a social phenomenon, as it appears when the affected person is in contact with his fellows. Simple social contact, for sexual or nonsexual aims, drives the patient into a state of fear of blushing, and the blushing is inevitable.

The person severely affected by blushing feels that he is forced to shame himself and blush. He feels that the other person is superior to him. He feels defenseless against influences apparently originating from the outer world and fights desperately and unsuccessfully against this foreign force. His helplessness makes him feel stupid. Try as he may, he has no power to avert the panic which rapidly overwhelms him. He stands exposed, reddened, beaten, lost, contrite as a sinner, ashamed before others and himself.

As a result, the blusher avoids public places and publicity. In seclusion, he tries to persuade himself that (a) he is an intelligent man with great knowledge, and a good position, (b) he is noble and

ethical, without blemishes on his record, (c) he has a nice complexion and a good appearance and is successful in life, business and love.

But as soon as he faces another person, such mental injections and stimulants do not work. There is no time for them in any event. Even a child, without hostile intentions, pushes the blood into the blusher's face, makes his heart beat like a watch gone mad, makes his palms wet.

The blusher hates the world and everybody in it, because anyone with whom he has the slightest contact can precipitate an attack of fear. A simple "Hello," on the street, a request by a stranger for an address, or the buying of something in a store affects him in the same way.

Blushing appears on criticism, blame or praise. The blusher is often scoffed at in society. If he feels he is expected to blush, he will struggle to prevent it but be unable to do so.

To compensate for his inability to resist, the patient uses such tricks as: eluding people, frequenting shadowy sidewalks, shunning the sun, pulling his hat over his eyes and wearing dark glasses to get the illusion of being alone. One of the writer's patients became a good customer for a dermatologist who, by ultraviolet treatment made his complexion like an Indian's and thus disguised the blushing for a short time.

If he is especially sensitive, the blusher lives like a hermit, refuses invitations, puts off appointments, drops good jobs, flees from entertainments, and prefers dark public places.

Another blusher's trick is to blow the nose so that the face reddens and is partly concealed by the handkerchief. The patient needs some time to overcome the sudden panic of meeting others; and the redness produced by noseblowing gives temporary immunity to blushing.

An interesting and frequently observed device for the same purpose is forced, senseless and unreasonable laughter. The local hyperemia produced conceals, or is an excuse for, the redness dreaded by the blusher.

Blushing may be replaced not only by these artificial means but by other equivalents—symptoms similar in mechanism. The writer has treated several patients with such symptoms. One of them,

an officer of high rank, on active military service, suffered immensely from tremor and from anticipated tremor of the head when giving reports to superiors or orders to inferiors. If the wind happened to blow so strongly that he swayed and observers could attribute this movement to the force of the wind, his symptom was entirely absent. The same man started to drink to increase his self-confidence and to cause himself to stagger. He did not conceal his drinking, but posed as a drunkard and preferred to be thought staggering from intoxication, rather than trembling from nervousness.

Another substitute for blushing is to become pale. This may make a person as conspicuous as blushing. The writer observed a woman who suffered from pallor of the face and tremor of the hand when she had to sign her name or to write before anyone else. This never occurred when she was alone. In her case, also: If there was an obvious cause for paleness and tremor—one which seemed adequate to her and to observers—these symptoms did not occur. Obviously blushing, pallor, or trembling arise only in situations where the patients can be made ashamed of them.

Numerous other symptoms of outstanding importance, because of their devastating social consequences, have similar psychic origin. Three of them are: stage fright, impotence which occurs only when coitus is obligatory (at a certain time and in a certain situation), and finally the so-called *esprit d'escalier, or Treppenweisheit.*

Certain social phenomena are more conspicuous in other parts of the world than in the United States. In European culture, the superior, "boss," king, president, father, is conceived—and justly— as demanding acknowledgment and appreciation of his superiority from everyone else by explicit or hidden signs of devotion, humility, prostration—briefly by impotence of every kind. It is not allowed, at least it is not advisable, to talk loudly in the presence of the superior, be lively, laugh, or eat, etc. If possible, one must stand, because comfort is his privilege. One should not blow the nose in his presence or use his bathroom. It is not wise to expose one's wisdom, knowledge and abilities, except so far as he needs information. He will decide how clever one is and how useful to his purposes. One cannot address him by his first name, come close to him, or wear a hat before him. One must signify in every way

that only he has the power. One must bend the head, bow to him, cringe. Any sign of embarrassment is useful: becoming pale, blushing, stammering or trembling—but only so far as it does not look like derision or challenge. You must know what he wants from you but you are not allowed to consider that the knowledge or ability you have makes it possible for you to replace him or to lay claim to his power. You may be able and potent, you may be a hero, but only so far as he can reward you. Do not go further, or you will threaten him and thus put yourself in danger.

Our whole religious and social life is full of such demands but it exceeds the scope of this paper to discuss them further.

Consider the three symptoms listed as having similar psychic origin to blushing.

(a) *In stage fright* a single motive upsets the whole psychic balance in the best actors and actresses. This motive is: "I know the rôle and I know I play well. But . . . but . . . in the situation lies the possibility that I might fail, and what will the audience say to my failure?" The thought of failure is a demand coming from the audience which seems to hypnotize the victim, so that he has to obey. The demand to fail lies in the situation.

(b) *In impotence in obligatory intercourse,* on occasions such as the wedding night or the first time a couple meets with the intention of coitus—or in marriage when the wife indicates to the husband that she is wearing her pessary, etc.—the patients feel they are not prophets, the coitus is not yet performed; there is a possibility of failure. The erection, not ruled by voluntary innervation, might fail. "And what will she think and say?" The demand for failure lies in the situation.

(c) *In esprit d'escalier,* the patients know perfectly what they have to do or to say. But—as at examinations—the moment they enter the room and are no longer in the anteroom—the moment they have to perform the action for which they are well prepared —everything is forgotten. The brain does not work, it becomes impotent.

All these three symptoms can be ranked under the same title: anxiety of examination. The possibility of failure is forced demandingly on the patient and lames the wished-for action. The most striking and agonizing fear is: "What will the other think,

what will the other say?'' Simultaneously, arises the feeling of being childish, inferior. Here is a deep source of the so-called ''inferiority complex.'' In their despair, the afflicted try—in various wrong ways—to pump into themselves some feeling of superiority. One method is to assume an attitude of aggressiveness, impertinence and insolence in society, using unusual freedom in addressing the opposite sex. Another method is to try to develop muscles like a prize fighter. Some persons try to be considered Don Juans, Casanovas, or dictators in business life; or they may become stupidly blind in danger, compulsory heroes or transatlantic flyers. All these efforts are attempts to get rid of influence from others by suppression, and to attain superiority over everyone.

Another striking feature in the symptomatology of blushing is ''borrowed blushing,'' as it might be called, that is blushing for others. A patient, a blusher, observed a boy and a girl apparently interested in each other chatting in a street car, and he supposed that they were observed by an elderly man standing nearby. Suddenly the question arose: ''What might this man think of the couple?'' The consequence of this thought was sudden blushing by the patient for the boy. Such a patient blushes in theaters or on public occasions when a speaker or player stops short and the patient becomes embarrassed. The patient identifies himself with the man in the tight spot and *he* blushes although the other does not.

Blame or praise have the same effect in causing blushing, for praise is felt as shame, because it places the person giving praise above the person praised. In any case, what is said is negligible, for the importance lies in the relationship and in the unconscious reaction to this relationship.

III

Deep analysis reveals that three important factors play a part in blushing: (1) a predisposing libidinous situation, (2) local sexual and social traumata of the face, and (3) general social traumata with confusion in building up the superego.

1. In every case observed by the writer there were distinct signs of early and violent sexual ripening on the genital level, before and after the latency period, and during puberty.

The early appearance of genital predominance can be attributed to an attempt to overcome castration fear. *Patients were attempting to overcome castration fear, not by regression but by progression.* Apparently, in such individuals, unknown biological factors help, or perhaps induce, them to create or to maintain such a progression. Adult patients try to overcome blushing by exaggerated sexual behavior, as in their childhood they tried to feel grown up. In childhood, reality contradicted the grown-up feeling and added more difficulties to those already experienced; gratification was still impossible—except by masturbation. In the writer's subjects, the masturbation, which was definitely genital, was not followed by the customary reproach: "Shame on you for self-abuse, you harmed yourself." It was not felt thus, even if it had that wording. The patient transformed the reproach into the following: "Shame on you; your practice is a lying pretense; a grown-up does not do that; he actually makes love. Shame on you, you are still a child."

One of the writer's patients, who came to analysis because of blushing, started to blush violently at his first job when he told the other employees, who were graduates of a high school that he had been graduated also. It was a lie. This lie ran parallel to a very lively event of his childhood. His father was a poor tailor. The patient had observed that his mother had an affair with a wealthy uncle who invited her and her child to stay at his expense every summer in the little village where he lived. The father remained at his work in the capital. The child often witnessed love relations between his mother and the uncle. But once, as he came to their home, the mother sent the boy away to visit friends. He was sent to the home of another wealthy family who did not know his father. When asked his father's profession, he lied: "He is a boss at a railroad station." This, in the eyes of a Hungarian boy, is the most marvellous job there is. From that time on, he felt uneasiness at meeting others and shame with an inclination to blush. The blushing as a neurosis appeared later. It was accompanied by impotence, although blushing was in the foreground. His first lie was to protect his father, as if he would say: "Father is a great man, the boss of a railroad station. Do not think that mother does

not love him and cheats him with uncle. There is nothing father has to be ashamed for, or mother either.'' But the lie did not help. He felt uneasiness from that time and when, during puberty, he lent himself to the second lie blushing broke out. He shamed himself for his parents.

2. Sexual excitement might appear on the face via the nose. All blushers are nasalerotic, according to Hermann.[3] We may assume that nasalerotism increases the patient's tendency to suspicion. Nasalerotics constantly ''smell'' what is happening in the outer world and show a mild, neurotic form of compulsion of persecution.

In blushers, the writer has observed masturbation-equivalents on the face; picking the nose, rubbing the eyes, pressing out blackheads, etc., all of which cause local hyperemia. Blushers are often exhibitionists with both genitals and face; they are voyeurs; they are scopophiliacs, i. e., they derive sexual pleasure from visual impression and from the use of the eyes.

In blushers, the writer has usually found that the erogenity of the face has been increased as the result of early experiences which at the same time produced genital excitation. Such are passionate and ardent kisses, affectionate pinching and pulling of the face and expressed admiration for a rosy complexion. Hermann[3] found that blushing is a reaction to heat stimuli. All these local traumata in the writer's patients contributed to the heat and helped to produce the reaction of shame and blushing.

One blusher reddened—perhaps this was the first occasion—as he came out of the bathroom having just urinated. He was in a hurry to play and had not replaced his penis properly. He met his mother and thought she saw and enjoyed admiring the bright red end of the penis. He saw, he said, his mother's face and eyes shining with joy.

Another patient's face became susceptible in a peculiar way. As a boy, he lived in a small village with poor sewage disposal. Men and women had their toilets close to each other, separated only by a wooden wall. When a woman went to the part reserved for women, he stole to the men's side, then put his head so far into the hole that it hung downward as he observed the nude and exposed parts of the woman. Blood ran to his face while he enjoyed what

he could see, and smell. During analysis, it turned out the blushing meant: "Shame on your face with which you secretly made love, instead of making love as does the grown-up, whom you pretend to be."

3. The most important factors—revealed by psychoanalytic investigation—have been local and general social traumata in the early history of the blushers.

All reported here were brought up in an environment where sex was unmentionable, visits to the bathroom were strictly private, and the intimate parts of the body were somehow disgraceful. But the child knew in each case that this superlative purity was not justified by what he saw and was not consistent with what he saw. What the child saw was rather hypocrisy and prudery than purity and chastity, as the facts were displayed to him by the grown-up man of the family. But, after having submitted to the ethical demands, the child felt ashamed and blushed for the others, as well as for himself. Reduced to simple phraseology, the unconscious situation might be summed up: "Father and mother taught me to be ashamed when I am naughty. Now, they are naughty, I have to make true their teaching and I have to become the father of my father and be ashamed for him instead of for myself." This is behind the phenomenon of borrowed blushing. A similar mechanism was described by Lampl in an admirable paper about borrowed conscience.[4] Children are trained to borrow shame by often hearing: "I am ashamed of you." As the flow of libido between parents and child is very lively and the ego-borders are indefinite, children easily assume the inclination to shame themselves for others and the ability to do so.

Often in their childhood, blushers were told: "I can see your naughtiness on your face," or, "Shame on you for lying without blinking," or, "How can you lie without blushing?" or, "The lie is written all over your face." In Hungary, a child's nose was touched as if a person could find out in that way whether a child lied or told the truth. The investigator told the child he had lied, if the tip of the nose was soft, that he had told the truth if it was hard. But the nose, of course, had the same consistency in lying or in truth-telling. The child would be greatly embarrassed, for he would realize that the means of investigation was false but that the

investigator, nevertheless, always found out that he was bad. After all, the child felt, the face could reveal what he had concealed. Needless to say, it was an investigation for erection, i. e., masturbation.

Blushers have been praised in childhood for blushing. The sexual or other fault was forgiven, for blushing revealed repentance. Blushing indicated a good boy. Good boys blush. Only good, so-called model boys become blushers, bad boys seldom do. First, the good boy shames himself; second, it is more obvious when a good boy commits a fault.

Punishing with a box on the ear or pulling the ear produces local redness, plus the accompanying shame. It serves as a local, social, physical trauma, creating a *locus minoris resistentiae* for blushing.

A masochistic heterosexual or homosexual trend is, in some patients, revived or produced by blushing, justifying Rado's statement concerning the libidinous activity of the skin.[5]

IV

Blushing is a compulsion to confess. Psychoanalytic authors, especially Reik, consider confession as a masochistic gratification.[7] The present writer does not agree. Should, for example, a thief or murderer return to the scene of his crime, it is not necessarily that his guilt impels him to seek punishment. He may simply want to make sure that he will not be caught, that he is safe from the consequences of his action.

A far more important unconscious factor than masochism in the compulsion of confession was revealed and emphasized in Hermann's latest book.[3] He writes: "A secret isolates. It is not the content of the secret that isolates but the act of keeping a secret. Love cannot bear secrets. Confession binds together; secrets build a wall where a continuous flow between two people is desired, as between a mother and child . . . In compulsion to confession it is not being a sinner that makes the burden of the secret unbearable . . . but the isolation and impoverishment in love of the individual."

In the present writer's opinion, the same process occurs in blushing. The danger consists in a wall being created between the blusher and the world. He cannot love and cannot be loved, if he

does not confess his or others' crimes and thus follow the demands of justice, personified in the demands of the family, society and God.

The blusher either must confess or prove that he is good by submitting. In so doing, he assumes the position of a person about to be hypnotized while the hypnotist may be anyone known or unknown in the environment. As Ferenczi[6] stated there must be a homosexual or heterosexual connection between two persons in the relationship of hypnosis. Hermann[3] lays great stress upon the sparkling and flashing eyes of the father when he is angry and is blaming the child. These, he holds, make a great impression, of which the memory—being highly terrifying—is deeply repressed. Blushers feel everybody's eyes are upon them. For the same reason, we picture gods appearing amid lightning and thunder, rulers seated in limelight with salvos of guns.

V

Shame and blushing are signs of dependence, because the blusher submits to the demands of the outer world to prevent the development of anxiety lest he be killed, eaten, castrated or not loved. But dependence creates—in an adult—another kind of anxiety arising through uncertainty, because life and gratification of wishes are dependent upon others. Thus a panic in the ego, "a circus movement of the ego," analogous to that of the heart, is created. Normal conductivity between ego and super-ego is disturbed: There is anxiety over not being loved or over being killed, or castrated. To avoid these dangers, submission, with shame and blushing, occurs. However, submission means dependence, with accompanying shame because of dependence. Libidinous anxiety is mixed with the social. One creates the other because the patient is unable to find a way out.

The crucial point is dependence, the compulsion to submit to demands of the outer world without discriminating or judging the demands. In the writer's opinion, blushers are ruled by a false super-ego (described by Hermann) which compels them to submit to these demands.

When a person is ruled by a false super-ego—states Hermann[3]—moral demands are not yet an integral and defined part of the

psyche. Such a person has a super-ego in the collective scheme. This kind of super-ego appears in everyday life in the assumption that everything that the family, nation, or society does is right—even if it is brutal, cruel and harmful to others. A person may be prevented from doing something because it is wrong, but his father, his family, his race, his nation can do it with impunity. The false super-ego, says Hermann, does not recognize absolute crime. It permits the eye for an eye, the tooth for a tooth code; it repeats the murderer's evil deed in his punishment; it allows others to shame and chastise the individual. The greatest lie, brutality, and injustice are justified if they are in the interest of business, of family, of race or of nation.

On the other hand, in the case of a real super-ego, says Hermann, "the effect of moral demands is perfectly independent of intimidating persons, and it is no longer the content, but a system which rules. It is endowed with absolute standards, the persons from whom it is derived and who are honored are invisible, voiceless and even dead."

The law in this case, when accepted by the individual, is followed without the presence of an outer authority and cannot be influenced by such an outer authority. The real super-ego is inside, and it makes the total personality independent of any blind, unreasonable influence from the outer world.

Thus the ashamed blusher, the trembler, the patient with stage fright or with *esprit d'escalier* or with impotence in obligatory intercourse are all ruled by the false super-ego. In addition, blushers have suffered from local sexual and social traumata, usually localized on the face.

These persons, feeling themselves to be in danger, submit in order to placate the outer world. But the cost of this defense is too high—sacrifice of independence, uncertainty in sexual gratification, and uncertainty in social life.

During the treatment, all presenting libidinous conflicts, all local and general traumata involved, must be worked through. The false super-ego must be pointed out; the time when the castration complex developed must be analyzed with special care. Thus, it is

possible to transform the false into a true super-ego so that the patient can participate—without dependence on others—in the pleasures and duties of life.

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STUDY OF A GROUP OF RECOVERED SCHIZOPHRENIC PATIENTS*

BY OTTO KANT, M. D.

The present investigation aims to determine the characteristic features of a group of recovered schizophrenics. It is hoped that at the same time the study will offer a basis for an approach to the problem of differentiation of the large and probably heterogeneous group of schizophrenic pictures.

Certain authors—especially Langfeldt,[1] and Malamud and Render[2]—who have recently studied the problem of prognosis in schizophrenia have also offered some material which has a bearing on the problem discussed in this paper. In contradistinction to those studies, which concern themselves with recovered and non-recovered patients, the present investigation considers recovered patients only. In this way, a relatively large group of recovered cases could be analyzed, with considerable attention devoted to the individual case.

Only the general results of this investigation are here reported. The more specific problems will be dealt with in other reports.

METHOD AND PROCEDURE

To obtain the data, the three following procedures have been carried out:

(a) As it appeared desirable to survey as long a period of recovery as possible, an attempt was first made to establish contact with all those patients who, having been admitted to the Worcester State Hospital with the diagnosis of schizophrenia between January 1, 1920 and December 31, 1935, were according to the hospital records discharged as "very much improved" or "recovered." With very few exceptions all these patients—none of whom had received any shock treatment—had been discharged and had remained out of the hospital for at least four years. The material thus gained did not appear sufficient for an elaborate study, all the more as it proved to be very difficult to get enough reliable material concerning those patients who had left the hospital more than 10 years ago.

(b) It was considered possible that recovery might have taken place in patients other than those who were discharged as "very

much improved" or "recovered." Therefore, it seemed advisable to consider all discharged schizophrenic patients who had been admitted during a shorter period of two and one-half years (July 1, 1931, to December 31, 1933). An exception was made in instances where at time of discharge unquestionable deterioration of long standing had taken place. This procedure proved justified later by the fact that several patients were found to be completely recovered who at the time of discharge were not considered so. The complete survey of these two and one-half years facilitated also the numerical evaluation of some of the results.

(c) Finally, to obtain a greater variety of personality types and family backgrounds, a group of former patients of Butler Hospital, Providence, R. I., was added.

Inquiry letters were sent to close relatives and the nearest friends of the former patients, mainly to get general information as to developments since discharge. On the basis of the replies, it was possible to discard those patients who were obviously not fully recovered. A personal interview with each of the remaining patients was arranged. Each was thoroughly reexamined and the type of his physique was determined. Several tests also were given (definition of proverbs, etc.) to discover even slight persisting disturbances of thought. Whenever possible, members of the family group were interviewed also.

For the present study, there are reports only on those patients for whom all information gathered (and the result of the personal reexamination) pointed toward complete recovery. The definition of complete recovery, as used here, is more rigid than the usual ones. It not only implies the absence of abnormal symptoms, and the absence of decline of social standards due to internal rather than to external factors, but it also implies complete restoration of the prepsychotic personality, as well as an objective attitude toward the previous illness and abnormal experiences.

An attempt was made to reach 260 former patients. Thirty-four cases were lost sight of because it proved impossible to get in touch with relatives or friends or the patients themselves. In all other cases—totalling 226—some information concerning the patient's present condition could be obtained.

For the numerical evaluation of the two and one-half-year period (July, 1931, to December, 1933), five patients on whom personal reexamination could not be carried out because of technical obstacles were also included in the recovered cases. In these five cases, the obtainable information conformed so well and pointed so strongly toward complete recovery that it is definitely felt that a lesser error is made in the percentage estimates by including these cases in the recovered group, rather than excluding them. However, for the determination of the characteristics of the recovered patients only those who were personally reexamined were included.

RESULTS

One hundred and two patients were personally reexamined, as the information gathered pointed towards good recovery. Of these, 49 could be considered completely recovered.[*]

In 10 of these, subsequent comparisons of record and catamnesis made it obvious that the original diagnoses were erroneous. These cases (e. g., cases of epilepsy, posttraumatic psychosis, etc.) which do not present any actual differential diagnostic problems of clinical differentiation were discarded from the present study.

It seemed advisable to group the remaining material—39 cases all of which conform to a conventional diagnosis of schizophrenia—according to the most outstanding features of the clinical picture and course. In spite of a certain amount of overlapping, it was possible to classify the recovered patients in five groups. In all five, some features were present which are unusual in the ordinary case of schizophrenia; indeed in the first three groups, strong admixtures characteristic of other clinical entities were present. The classification has been made in the order of prevalence of atypical features, these being most prominent in the first and least evident in the last group.

Group I: Resembling atypical depressive states, 11 patients (four male and seven female). In each one of these cases the major alteration was in the affective sphere, both cross-sectionally and longitudinally. The other symptoms, on the basis of which the diagnosis of schizophrenia had previously been made, were more or less significantly related to the basic affective disturbance. In

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*The calculation of the percentage of recovery on the basis of this figure is not permissible, because of incompleteness of the material. The numerical evaluation given in a later portion is based only on that two-and-a-half-year period from which statistically valid information could be obtained.

eight cases, the picture resembled mainly that of an atypical depression; in three cases, that of an anxiety-depression with acute paranoid trends.

Group II: Resembling atypical manic states, six patients (four male, and two female). In all of these pictures the manic elation appeared as the basic change. In so far as the psychotic experiences were of the schizophrenic type, they were throughout related to the affective disturbance.

Group III: Manic and depressive features outstanding, six patients (three male, three female).

While manic and/or depressive structures were prevalent in the first three groups, the following group does not have such a close relation to manic-depressive symptomatology.

Group IV: Alternating conditions of excitement and stupor predominant, 10 patients (six males, four females). All these patients also exhibited some manic-depressive features. Pronounced schizophrenic experiences and syndromes were but slightly represented in this group.

Group V: Prevalence of schizophrenic symptomatology, six patients (all male). Five patients exhibited a catatonic and one an acute paranoid picture.

PERCENTAGE OF RECOVERY

During a two-and-a-half-year period (July 1, 1931, to December 31, 1933) a total number of 308 patients diagnosed schizophrenic were admitted to the Worcester State Hospital. Of these patients, 26 were considered completely recovered. Six patients had to be omitted from the study, because previous diagnoses had been proved erroneous. From a total of 302 schizophrenic patients (308 minus six discarded patients*) thus 20, i. e., 6.62 per cent were found completely recovered.

*The possibility of diagnostic errors in the non-recovered group, which might greatly influence the numerical results, has not been overlooked. In selecting the material, the record of every admission during the two-and-a-half-year period was surveyed by the writer himself. Some definite diagnostic errors (some of which were confirmed by catamnesis) were found among patients, classified as neurotic or manic-depressive, who had been hospitalized for a short period only. No diagnosis seemed definitely questionable among the nonrecovered schizophrenic group. As opposed to the recovered patients, who were discharged from the hospital after acute episodes, the non-recovered patients have presented ample opportunity for further observation and eventual correction of diagnosis.

If the first three groups, which show fairly close connection with the manic-depressive group, are disregarded and only the recoveries occurring in Groups IV and V are counted, there remain only five cases, i. e., 1.65 per cent. Considering the fifth group alone, in which the clinical picture is undoubtedly most schizophrenic, there are only two recovered patients, i. e., 0.66 per cent.*

Review of the Various Previous Diagnoses of the Recovered Patients

In several of the recovered cases the official diagnosis was changed more than once. The various successive diagnostic labels are listed below. An analysis of these data is rather revealing. First, the final diagnoses of the Worcester State Hospital and of the Butler Hospital respectively are given; they are followed by the various other diagnoses offered in chronological order. If the patient suffered more than one attack, the different periods are indicated by Arabic numerals:

Group I

Ga. Schizophrenia, unclassified; alcoholism, hallucinosis type; unclassified psychosis.

Wh. Dementia præcox, unknown; manic-depressive psychosis, depressive type; schizophrenia.

An. Schizophrenia; catatonia or hysteria or depressed phase.

Do. 1) Psychopathic personality with psychosis; schizophrenic episode with psychopathic personality.
2) Schizophrenia, other types.

Go. Schizophrenia.

Fs. Schizophrenia.

Bt. 1) Schizophrenia, catatonic.
2) Catatonia-stupor reaction, schizophrenia or depression of manic-depressive group considered.

Cn. Schizophrenia, psychoneurosis.

Pt. Schizophrenia, other types.

Kk. Schizophrenia, paranoid; schizophrenia or depressive reaction during involutional period considered.

An. Schizophrenia, catatonic.

*The fact that several patients were completely lost sight of does not seriously weaken the validity of our numerical evaluation. As these cases represent only a minor percentage of the total admissions and the general percentage of recovery was found very small, the addition of "lost" cases could cause a deviation within the limits of a fraction of 1 per cent only.

Group II

Pn. Dementia præcox, other types.

An. Schizophrenia, catatonic.

Wi. Schizophrenia, catatonic; manic-depressive, manic; manic-depressive, manic.

As. Schizophrenia, catatonic.

Pe. Dementia præcox, catatonic.

Dn. Schizophrenia, other types (hebephrenic-paranoid); undiagnosed psychosis, schizo-affective.

Group III

Ls. Schizophrenia, catatonic; manic-depressive, mixed.

Md. 1) Schizophrenia; no diagnosis.
    2) Not insane.
    3) Manic-depressive, mixed.
    4) Schizophrenia, other types; psychosis with other disease.

Wd. 1) Manic-depressive, hypomanic.
    2) Dementia præcox, catatonic.

Mz. 1) 2) 3) Manic-depressive.
    4) Psychosis with psychopathic personality.
    5) Schizophrenia, other types; trance state.

De. 1) Schizophrenia; psychosis with psychopathic personality.
    2) Psychosis with mental deficiency, schizophrenic reaction.

Gn. 1) Schizophrenia, catatonic.
    2) Dementia præcox, hebephrenic.

Group IV

Ng. Dementia præcox, catatonic.

Ge. 1) Manic excitement, constitutional inferiority.
    2) Psychosis with mental deficiency; alcoholism?
    3) Dementia præcox; alcoholism.
    4) Dementia præcox in feebleminded.
    5) Psychosis with mental deficiency.
    6) Dementia præcox, hebephrenic.

Fi. 1) Dementia præcox.
    2) Dementia præcox, hebephrenic; manic-depressive, manic.

Ml. Dementia præcox, catatonic; dementia præcox, unclassified.

De. Dementia præcox, catatonic; psychosis with mental deficiency, moron; manic-depressive, manic.

Sy. Schizophrenia, catatonic.

Md. Schizophrenia, catatonic.

Re. Schizophrenia, catatonic; undiagnosed psychosis.

Se.   1) Dementia præcox.
      2) Schizophrenia, manic coloring.
Ky.   1) 2) 3) 4) 5) 6) Dementia præcox, catatonic.

GROUP V

Br.   1) Dementia præcox, paranoid; dementia præcox, catatonic.
      2) Dementia præcox, catatonic.
Ne.   Dementia præcox, catatonic.
Dn.   Schizophrenia, catatonic.
Pt.   Dementia præcox, catatonic.
Vt.   Dementia præcox, catatonic.
Gs.   Schizophrenia with paranoid mechanism.

It should be noted that the diagnosis in many cases has been changed one or more times in all groups with the exception of Group V. This implies that the previous psychiatric observers were much more in doubt diagnostically about the patients in the first four groups than about those of Group V. Previous psychiatric evaluations thus confirm the already stated assumption that the pictures included in Group V most closely conform with the average conception of schizophrenia. The only change of diagnosis in Group V refers to sub-types of the same disease entity.

Most of the diagnoses other than schizophrenia suggest some type of manic-depressive disease (14 cases). Far less numerous are diagnoses of neurotic or psychopathic states (six cases). The few remaining diagnoses are divided between psychotic states on the basis of alcoholism and psychoses with mental deficiency. That no other symptomatic diagnoses had been mentioned is due to the fact that all those cases in which a definite exogenous etiology was known were discarded in the beginning of our study.

Following is given the distribution of sub-type diagnoses for the admissions between July 1, 1931 and December 31, 1933 and the number of recoveries in each category.

	Total of admissions	Recovered
Paranoid	92	..
Catatonic	75	9
Hebephrenic	28	1
Simple	16	..
Unclassified and others	91	10
Total	302	20

Missing among the recovered patients are those diagnosed as paranoid or simple schizophrenics, while only once is hebephrenia suggested. All other cases are nearly equally divided between the catatonic and the unclassified (and others) groups. The nine diagnosed as catatonic distribute themselves among our five clinical types as follows: one case resembling atypical mania, two cases with outstanding manic-depressive features, four cases of excitement alternating with stupor, and two catatonic states. The 10 cases of the "unclassified and other" groups represent six cases resembling atypical depressive states, two resembling atypical manic states, and two with outstanding manic-depressive features. The one recovered patient previously diagnosed as hebephrenic definitely falls within our third group (cases with outstanding manic-depressive features).

Precipitating Factors

Precipitating factors were considered such, only if an unquestionable relation between them and the psychotic reaction, especially the content of the psychosis, could be demonstrated.

Out of 39 cases, definite psychogenic precipitating factors were obviously present in 29. In six other cases, psychogenic precipitating factors were suspected, but the available information was insufficient to warrant a definite statement. There were only four cases where there was no indication of psychogenic precipitating factors.

In eight cases, physical precipitating factors, such as physical disease and other exhaustive factors—hyperthyroidism, alcoholism, and postnarcotic effects—were present. In five of the eight cases, the physical factors were combined with obvious psychogenic elements. In the three others, psychogenic factors were questionable. In none of the cases did physical factors alone seem to have been definitely of precipitating significance.

Four cases remain in which there was no evidence either of psychic or of physical precipitating factors. In the first one—a prolonged hypochondriacal condition resembling an atypical depressive state—belated puberty may have been an important factor. The second case is that of a girl with degenerative features who had very frequent attacks resembling atypical manic and depres-

sive periods, probably mainly on an endogenous basis. The two remaining cases represent periodic attacks of the Group IV type.

STATE OF CONSCIOUSNESS

Clouding of consciousness—the diagnostic and prognostic significance of which has been discussed in another paper[3]—proved to be a remarkable feature throughout the entire course or during a greater part of the psychoses in 26 of the 39 recovered patients, i. e., in two-thirds of the total. In two more, some clouding was probably also present. In the remaining 11, clouding of consciousness does not seem to have been an outstanding feature of the clinical picture.

No definite relations could be established between either psychogenic or physical precipitation on one hand and presence or absence of clouding in the clinical picture on the other.

ONSET AND DURATION

Table 1 gives a review of the types of onset, of the duration of the psychoses to the time of substantial improvement and complete remission, and of the length of hospitalization. It also contains data of previous attacks and the time which has elapsed since recovery.*

Onset: There is a striking difference between the type of onset in those cases resembling atypical depressive states (Group Ia) and in all other cases. Among the former, six out of eight cases show an insidious onset while the onset in the remaining two has been subacute. In all other groups, only acute (20) or subacute (11) onsets have occurred. Seventeen cases, i. e., more than half the combined group of cases with acute or subacute onset, had exhibited definite prodromal symptoms over periods ranging from one week to three years. It seems quite likely that better observation on the part of relatives might have shown prodromal symptoms in some of the other cases as well.

Duration: Taking all groups together, the average duration of the psychotic state until complete remission was seven and one-quarter months. The shortest duration was one month and the longest three years and five and one-half months. The mean differ-

*As Table 1 shows, those four patients who were discharged only three years ago or less have had similar previous attacks from which they completely recovered, between seven and 25 years ago.

TABLE 1. ONSET AND DURATION OF PSYCHOSIS; PREVIOUS ATTACKS

Group	Patients	Onset	Prodromal symptoms	Time until Substantial improvement	Time until Complete recovery	Length of hospitalization	Time since discharge	Number of attacks	Years since 1st recovery	Age at 1st attack	Age at Most recent attack
Ia.	Ga.	Insidious		4 wks.	3 mos.	2 mos. 2½ wks.	7 yrs.	1		18	18
	Wh.	Insidious?		Gradual	10½ mos.	9 mos. 3 wks.	5 yrs.	1		27	27
	An.	Insidious		9 mos.	1 yr.	2 2/3 mos.	10 yrs.	1		21	21
	Do.	Subacute		1¾ yrs.	2 yrs.	2 yrs.	5 yrs.	2	10	18	22
	Go.	Subacute		Gradual	6½ mos.	6 mos. 1 wk.	7½ yrs.	1		20	20
	Fs.	Insidious		9 mos.	11 mos.	7 mos.	5 yrs.	1		25	25
	Bt.	Insidious		5 mos.	7½ mos.	6 mos.	4½ yrs.	2	20	22	38
	Cn.	Insidious	3 yrs.	3½ mos.	6 mos.	7 wks.	6 yrs.	1		24	24
Ib.	Pt.	Acute	Indefinite	Gradual	1 yr.	10 mos.	5 yrs.	2	16	18	28
	Kk.	Subacute	6 mos.	10 days	7 mos.	7 mos.	10½ yrs.	1		47	47
	An.	Acute	2 years	3½ mos.	5 mos.	5 mos. (approx.)	6 yrs.	1		33	33
II.	Pn.	Acute	1 wk.	Gradual	2 mos.	2 mos. (approx.)	4 yrs. (approx.)	1		21	21
	An.	Acute	6 mos.	4 wks.	8 wks.	7½ wks.	6 yrs.	1		35	35
	Wi.	Acute	10 days	Gradual	1 yr. 2 mos.	1 yr. 2 mos.	6 yrs.	1		24	24
	As.	Acute		5 wks.	7 wks.	7 wks.	7 yrs.	1		22	22
	Pe.	Subacute	Several mos.	2½ mos.	3 mos.	3 mos.	3½ yrs.	1		19	19
	Dn.	Acute	4 wks.	10 wks.	7 mos.	5 1/3 mos.	3¾ yrs.	1		22	22

TABLE 1. ONSET AND DURATION OF PSYCHOSIS; PREVIOUS ATTACKS—(Concluded)

Group	Patients	Onset	Prodromal symptoms	Time until Substantial improvement	Time until Complete recovery	Length of hospitalization	Time since discharge	Number of attacks	Years since 1st recovery	Age at 1st attack	Age at Most recent attack
III.	Ls.	Subacute		Gradual	1 yr.	11 mos.	6½ yrs.	1		23	23
	Md.	Subacute		Gradual	2 yrs. 8 mos.	2 yrs. 8 mos.	4½ yrs.	4	21	22	36
	Wd.	Subacute	3 mos.	2 wks.	1 mo.	3 wks.	4 yrs.	2	12	22	30
	Mz.	Subacute		Gradual	2 yrs.	2 yrs. (approx.)	4½ yrs.	12	19	15	28
	De.	Acute		6½ mos.	3 yrs. 5½ mos.	1 yr. 8 mos.	5 yrs.	1		14	14
	Gn.	Acute		Gradual	13 wks.	6½ wks.	3 yrs.	2	7	19	23
IV.	Ng.	Acute		Gradual	2 yrs. 5 mos.	2 yrs. 5 mos.	4 yrs.	1		24	24
	Ge.	Subacute		Gradual	6 mos.	6 mos.	1½ yrs.	6	25	29	52
	Fi.	Subacute	1 wk.	5 mos.	8 mos.	6 mos.	4 yrs.	2	10½	19	26
	Ml.	Acute		2 wks.	6 wks.	6 wks.	1 mo.	4	13½	22	36
	De.	Acute		3 mos.	6 mos.	3 mos.	4 yrs.	1		19	19
	Sy.	Subacute		1 mo. 3 wks.	2 mos.	1 mo. 3 wks.	4 yrs.	1		17	17
	Md.	Acute		Gradual	4 mos.	4 mos.	5 yrs.	1		24	24
	Re.	Subacute	3 mos.	4 mos.	7 mos.	6½ mos.	4½ yrs.	1		22	22
	Se.	Acute		2 mos.	3½ mos.	4 mos.	6 yrs.	2	8	19	22
	Ky.	Acute and subacute		12 days	2 mos.	2 mos.	3 yrs.	6	25	19	49
Va.	Br.	Acute	3 wks.	2 wks.	3 mos.	1 mo. 3 wks.	5 yrs.	3	19	44	58
	Ne.	Subacute	3 yrs.	Gradual	8 mos.	8 mos.	4 yrs.	1		22	22
	Dn.	Acute	5 mos.	5 2/3 mos.	6 mos.	6 1/3 mos.	6 yrs.	1		18	18
	Pt.	Acute	3 yrs.	4½ mos.	11 mos.	7 mos.	4 yrs.	1		23	23
	Vt.	Acute		1 wk.	1 mo.	1 mo. 4 days	7¾ yrs.	2	10	40	42
Vb.	Gs.	Acute	3 mos.	Gradual	5 mos.	4 mos. 1 wk.	10 yrs.	1		29	29

ences between the subgroups are not great. The shortest average, consisting of five months, is found in the atypical mania-group. The absolute shortest duration of one month appears several times in Groups IV and V. The longest duration of three years and five and one-half months is shown by one of the cases of Group III (manic-depressive features outstanding). The average duration of the attack until substantial improvement had been achieved could not be calculated, as the improvement in many cases apparently occurred rather gradually. It may be stated, however, that with very few exceptions the substantial improvement occurred before the patient left the hospital.

Number of attacks: In 14 out of 39 cases, there was more than one attack. In eight cases, the last psychotic attack observed was the second one. One patient in Group III had already had more than 10 attacks.

Sex: While the 302 schizophrenic patients admitted during the two and one-half-year period to which the numerical analysis refers consist of 148 males and 154 females, the 20 recovered cases of the same period include 11 males and nine females. The difference in sex distribution among the recovered patients is so small that no conclusions as to importance of sex for recovery can be drawn.

Civil status: Of 39 recovered patients, 30 were unmarried at the time of their psychoses—six of them were under 20—and nine were married. At the time of reexamination, nine of the 30 had been married and one was engaged, so that about one-third have changed their civil status from unmarried to married after recovering from the mental attack.

Age at onset: The age at the time of the most recent hospitalization must be distinguished from the age at the time of the first attack of mental disease. Table 2 gives a review of the distribution of decades.

None of the recovered patients had the first attack later than 50, only three of them later than 40 and two of them later than 30. More than one-half of the total (22) had the first attack in the third decade and not quite one-third (12) in the second decade. The lowest age was 14 and the highest 47 years for the first attack. The highest age represented in our table is 58 years (third attack of the last-mentioned patient).

TABLE 2. DISTRIBUTION OF AGES

| | Number of patients | |
Age limits	At time of last onset	At time of first attack
10-19	6	12
20-29	22	22
30-39	6	2
40-49	4	3
50 and over	1	0
Total	39	39

HEREDITY

The heredity of 44 patients (39 plus five patients not personally reexamined) was considered. The number of patients in whose heredity one or more of the following conditions have been found is listed. For the purpose of this study, no distinction has been made between hereditary data in the direct and collateral lines.

The listing shows:

Paranoid condition	2
Schizophrenia	4
Manic-depressive	15
Atypical or mixed manic-depressive	6
Epilepsy	1
Reactive psychosis	1
Organic brain disease	3
Feeblemindedness	3
"Nervousness"	12
Alcoholism	12
Psychosis without further information available	5

The vague term "nervousness" was used for those cases in which remarkable nervous and neurotic features or abnormal personality traits were mentioned. Unquestionable functional psychoses could be detected in the hereditary background of 19, or 43 per cent, of the recovered patients. In 15 cases, some type of manic-depressive disease is recorded. In six, atypical manic-depressive conditions are mentioned. The heredity of three patients presents one case of typical as well as one of atypical manic-depressive disease. The total of cases in which some kind of manic-depressive disease is present is therefore 18.

Schizophrenia has been found in the heredity of four cases. In two of these cases typical manic-depressive states are also mentioned; in the other two, atypical manic-depressive states are asso-

ciated. In no case was exclusively schizophrenic heredity recorded. Schizophrenic heredity, however, according to the information available, was entirely absent only in the two end-groups (cases resembling atypical depression and catatonic and acute paranoid states respectively).

PERSONALITY

It has been the writer's intention not to limit the classification of personality features to an "either-or" from the beginning. In the compilation of the material, attention was focussed on the most striking features of the personality structure, i. e., the "Gestalt diagnosis" was applied to the personality structure as it had been done before in appraisal of the clinical picture. By this means, it was sought to avoid limiting personality characterizations to the two types of cyclothymic and schizothymic. Nevertheless, as these types apparently characterize best a large section of the compiled personality traits, their final use seems justified. They are referred to principally in the meaning of extraversion and introversion, thus combining the antithesis expressed by Kretschmer's conception with the basic ideas of Jung's typology. While extraversion or introversion actually was the most striking feature in a number of the cases, it appeared that in others, certain other features were equally, or even more, impressive. These other traits, to which the general term "psychopathic" is provisionally applied, consist of three subgroups of peculiarities. These, although partly related to each other and overlapping, appear to be well enough outlined to require a separate description.

(a) *The labile type* is characterized by being easily upset and thrown out of balance when unusual situations of emotional value arise. Because of this continuous threat, irritability and headstrongness are outstanding; and the lability usually is associated with great impressionability. Not infrequently, patients of this type characterize themselves as "very emotional."

(b) *The neurotic type* is characterized by the prevalence of neurotic attitudes as expressed towards the sex sphere and by the predominance of compensatory trends and of "facades."

(c) *The infantile type* is betrayed by marked immaturity of personality which very often is reflected also in the physical build. Persons of infantile types appear much younger than their actual

ages. Their conduct in life and their general attitude show that they have not reached the maturity corresponding to their ages; this is frequently in spite of good intellectual development.

Inclination to abnormal reactions and unfitness to overcome emotional difficulties are common characteristics of all three types.

As the description shows, the sense in which the term "psychopathic" is used here does not coincide with the more abnormal degree of cyclothymic and schizothymic personalities. For these, Kretschmer's terms of "cycloid" and "schizoid" have been reserved. In Table 3, only one personality feature is mentioned, if it is the only really striking one. In cases in which two features appear to be significant (e. g., extraversion and neurotic attitude) the one which is more prominent is mentioned first. The same table includes also the physiques and intelligence levels. The term in parenthesis in the physique column indicates slight admixtures.

A review of the distribution of personality types shows a total of 19 cyclothymic-psychopathic, nine cyclothymic, four neurotic, three schizothymic-psychopathic, two mixed (cyclo-schizothymic) types, one mixed-neurotic and one schizothymic type.

Twenty-eight out of 39 cases, i. e., 72 per cent, belong to either cyclothymic or cyclothymic-psychopathic types and not more than four patients, i. e., 10 per cent, to either schizothymic or schizothymic-psychopathic types. Psychopathic traits (psychopathic in the sense used here) are represented alone or with other features in 27 cases, i. e., in 69 per cent. The combination of cyclothymic temperament and psychopathic traits is found in 19 cases. The highest representation of this combination is in Group I (nine of 11 patients).

PHYSIQUE

A review of the distribution of physiques shows 20 definitely predominantly pyknic, 12 predominantly leptosomic, three atypical, two predominantly athletic, and two infantile-dysplastic types.

Group III contains predominantly pyknic physiques only. It is followed by Group I, where seven predominantly pyknic types occur among 11 patients. The only group in which no predominantly pyknic physiques are represented at all is Group II (six cases resembling atypical manic states). If the leptosomic and athletic types which, with the dysplastic, have been correlated by Kretsch-

mer with the schizothymic personality, are grouped together, they are mostly represented in Group II (five out of six cases); then follows Group V (four out of six cases).

TABLE 3. PERSONALITY, PHYSIQUE AND INTELLIGENCE

Group—Pts.	Personality	Physique	Intelligence
Ia. Ga.	Cyclothymic	Leptosomic	Average
Wh.	Cyclothymic-psychopathic (infantile)	Infantile (atypical)	Superior
An.	Cyclothymic-psychopathic (labile)	Pyknic (atypical)	Low average
Do.	Cyclothymic-psychopathic (labile)	Pyknic (atypical)	Low average
Go.	Cyclothymic-psychopathic (neurotic)	Pyknic (atypical)	Average
Fs.	Psychopathic (labile)—Cyclothymic	Pyknic (dysplastic)	Average
Bt.	Psychopathic (neurotic)—Cyclothymic	Atypical	Average
Cn.	Psychopathic (neurotic)—Schizothymic	Infantile (atypical)	Average
Ib Pt.	Cyclothymic-psychopathic (infantile)	Pyknic	Average
Kk.	Cyclothymic-psychopathic (neurotic)	Pyknic	Superior
An.	Cyclothymic-psychopathic (neurotic)	Pyknic (dysplastic)	Average
II. Pn.	Cyclothymic	Leptosomic (atypical)	Superior
An.	Cyclothymic	Leptosomic (atypical)	Average
Wi.	Cyclothymic	Leptosomic	Average
As.	Cyclothymic-psychopathic (neurotic)	Athletic (atypical)	Average
Pe.	Psychopathic (neurotic)	Atypical (infantile)	Average
Dn.	Mixed type	Leptosomic (pyknic)	Superior
III. Ls.	Cyclothymic	Pyknic	Superior
Md.	Cyclothymic	Pyknic (atypical)	Average
Wd.	Cycloid	Pyknic	Low average
Mz.	Cycloid-psychopathic (labile)	Pyknic (dysplastic)	Borderline
De.	Psychopathic (infantile-neurotic)	Pyknic (infantile)	Borderline
Gn.	Schizothymic	Pyknic	Low average

TABLE 3. PERSONALITY, PHYSIQUE AND INTELLIGENCE—(Concluded)

Group—Pts.	Personality	Physique	Intelligence
IV.			
Ng.	Cyclothymic	Athletic (leptosomic)	Low average
Ge.	Cyclothymic	Pyknic	Borderline
Fi.	Cyclothymic-psychopathic (infantile)	Pyknic (atypical)	Borderline
Ml.	Cyclothymic-psychopathic (infantile-neurotic)	Pyknic	Average
De.	Cyclothymic-psychopathic (labile)	Pyknic	Borderline
Sy.	Cyclothymic-psychopathic (labile-infantile)	Leptosomic (infantile)	Average
Md.	Cyclothymic-psychopathic (neurotic)	Pyknic (dysplastic)	Average
Re.	Psychopathic (neurotic)	Leptosomic	Superior
Se.	Psychopathic (neurotic)	Leptosomic (atypical)	Average
Ky.	Mixed type	Atypical	Low average
Va.			
Br.	Cyclothymic-psychopathic (neurotic)	Pyknic	Superior
Ne.	Cyclothymic-psychopathic (neurotic)	Leptosomic (atypical-dysplastic)	Average
Dn.	Psychopathic (infantile)—Schizothymic	Leptosomic (infantile)	Average
Pt.	Psychopathic (infantile)—Schizothymic	Pyknic	Low average
Vt.	Mixed—Psychopathic (neurotic)	Leptosomic	Superior
Vb.			
Gs.	Cyclothymic-psychopathic (neurotic)	Leptosomic (atypical)	Superior

CORRELATION BETWEEN PERSONALITY TYPE AND PHYSIQUE

Coexistence of predominantly cyclothymic temperament and pyknic physique occurs in 17 out of 39 cases, i. e., in 44 per cent.

In other words, somewhat less than one-half of the recovered patients exhibit a cyclothymic-pyknic makeup. This combination is found mostly in Group I, and it comprises all three cases resembling paranoid anxiety-depressions.

Of the four predominantly schizothymic personality types, two have a pyknic, one a leptosomic, and one an atypical physique. The only recovered patient who exhibits a combination of schizothymic temperament and leptosomic physique is a catatonic of Group V. (In this case also infantile features are present in both the patient's personality and his physique.) The combination of schizothymic temperament and atypical physique occurs in a case of Group III.

INTELLIGENCE

Out of 39 patients, 18 show average intelligence, nine superior, seven low average, and five borderline. The greatest relative percentage of higher intelligence is found in Group V; otherwise no definite trend is discernible.

COMMENTS AND CONCLUSIONS

Considering only the cases with predominantly schizophrenic structure of the clinical picture, one reaches a conclusion which is fairly consistent with the old assumption of Kraepelin; within this group (Group V) the rate of complete recovery is below 1 per cent (0.65 per cent). If all cases conventionally diagnosed as schizophrenic are considered, the recovery rate is between 6 and 7 per cent. The relative smallness of these figures as opposed to those of some other investigators may be explained in part by the strict criteria which were applied to the term "complete recovery" and in part perhaps by the thorough examination which it was possible to carry out in each case seen.*

Reviewing the clinical types which make up the recovered cases, one looks in vain for any case of simple or hebephrenic schizophrenia or of gradual paranoid development. As these subgroups were well represented among the admissions of the same period, the result of the investigation makes it probable that their prognosis, as to complete recovery, is absolutely bad. It is unlikely that the absence of these subtypes of schizophrenia is due to mere

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*According to Donald Blair's paper,[5] which was received after completion of this study, of 120 patients followed up for periods varying from one to six years after hospitalization, only eight (6 per cent) were "much improved" (or possibly recovered).

chance. As was pointed out in greater detail in a previous paper,[4] the recovered cases exhibit well-defined characteristics which seem incompatible with a simple, a hebephrenic, or a gradually developing paranoid form.

Five clinical types could be distinguished among the recovered cases. With the exception of the first group (cases resembling atypical depressive states), all types exhibit those features which conventionally have been regarded as prognostically favorable: clinical picture of an excitement state, acute or subacute onset, and usually rather stormy but short course (average not more than seven and one-quarter months). The far greater majority had their first attack during the second or third decade.

Langfeldt's statement that most of the recovered cases belong to what he calls the "atypical schizophreni-form conditions" is definitely confirmed by these findings.* Clinically the pictures of four of the five groups range between atypical manic or depressive syndromes and excitement or stupor states. The manic-depressive element, which in its importance as a factor favorable for recovery has been stressed by Mauz,[6] Langfeldt, and, to a certain degree, by Malamud and Render ("positive affect, motor overactivity") is thus well evident in the findings here also.

Another important feature in the clinical picture is the presence of clouding of consciousness in at least 26 of the 39 cases, although in our study all cases of definite exogenous origin have been excluded (contrary to Langfeldt's recovered group in which exogenous factors seem to have been of definite importance). Exogenous precipitating factors were noted in only six of the cases with prevailing clouding of consciousness; and even there they were usually associated with psychogenic factors. Precipitation by psychic factors, however, was an outstanding characteristic of all groups. It is, therefore, an obvious conclusion that in various groups of psychotic states which ended in recovery and which were mainly psycho-reactive in origin, psychotic symptoms of the schizophrenic type occurred in a setting of changed consciousness and on the

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*Of the three cases (3 per cent of his total group) in which Langfeldt assumed recovery in typical cases of "process-schizophrenia," the author is in doubt in two, as to whether one would not better be classified as a case resembling an atypical depression and the other as a paranoid involutional psychosis (Cases 77 and 100). In the third case, it is interesting to note Langfeldt's statement that "the symptomatology was mainly exogenically conditioned" and that the disease occurred "in connection with an attack of influenza, probably combined with mild meningitis as a complication."

background of a predominantly manic or depressive alteration, or of an incoherent excitement state. This characterization can be applied to all but the fifth group. But even in this predominantly schizophrenic group, the psycho-reactive nature of the disorder is quite obvious in the majority of cases.

The inquiry into the personality background shows a remarkable numerical predominance of cyclothymic temperament and of pyknic physique; the former is present in nearly two-thirds, the latter in half of all cases. Combination of both features is found in 43 per cent. These figures indicate the prognostic importance of the cyclothymic-pyknic constitution, a matter quite consistent with the high incidence of manic-depressive elements in the clinical pictures of the recovered patients. These results confirm the rather general opinion of Kretschmer's school that cyclothymic constitutional factors are prognostically favorable, an assumption which partly has been accepted in recent studies by Langfeldt and by Malamud and Render.

Our results, however, bring out a further significant fact: Certain psychopathic features, described as labile, neurotic, and infantile traits, are found in the personality structures of the recovered patients about as frequently as the cyclothymic temperament. Therefore it is likely that the prognostic significance of those psychopathic features is comparable to that of the temperamental makeup.*

It is interesting to note that the combination of schizothymic personality and leptosomic physique, which has been most closely related to the schizophrenia group by Kretschmer and his school, is found only *once* among all the recovered patients, i. e., in 2.5 per cent.

The review of constitutional factors is complemented by our heredity-findings.† The results of Langfeldt's and of Malamud and Render's investigations pointing to the relatively high incidence of hereditary taint in recovered schizophrenics are definitely confirmed.

*A definite answer to this question can be given only by a comparative study of the personality. Such a study is now in preparation. The purpose of the present study is mainly to outline those features which appeared to be outstanding in the recovered group, without considering the question of their absence or presence in the deteriorated group.

†Although no completeness of the hereditary findings is claimed, it may be assumed that the amount of available data is approximately equally distributed among the total of 44 cases. The positive findings, therefore, will not give too distorted a picture of the true distribution of the various types of mental disease in the heredity.

The analysis of our material shows that the incidence of manic-depressive disease in the hereditary background of the recovered patients is four and one-half times greater than that of schizo-phrenia. Furthermore, in no case was an exclusively schizophrenic taint found. Since the hereditary taint of the recovered group is mainly of the manic-depressive type, the relatively high incidence of functional psychoses in the heredity is not so surprising. It is in accordance with the generally accepted dominance of the manic-depressive disposition.

Of some interest is the fact that about one-half of the unmarried recovered patients have married since discharge from the hospital, which is also indicative of some extraversion of temperament.

Significant differences between the two sexes could not be established.

The distribution of intelligence levels did not reveal any consistent trend. Superior intelligence was represented as well as border-line intelligence, and it may be recalled that all those states labeled as "mental deficiency with psychosis" had been discarded from this study at the beginning.

Summary

1. A followup study based on personal reexaminations was made of completely recovered, although not shock-treated, schizophrenic patients, admitted to Worcester State Hospital between 1920 and 1935. In addition a group of similar patients from a private institution, Butler Hospital, was examined to obtain a larger variation of social atmosphere and family background.

2. Numerical evaluation of a two and one-half-year period, July 1, 1931, to December 31, 1933, showed a rate of 6.62 per cent for complete recovery if all cases exhibiting some schizophrenic symptomatology were considered. For the group with predominantly schizophrenic symptomatology, the recovery rate was 0.66 per cent.

3. Among the recovered patients, there was no case of simple or hebephrenic schizophrenia or of gradual paranoid development. All the cases, except one group resembling atypical depressive conditions, exhibited the clinical picture of an excitement state.

4. Five definite clinical types of recovered schizophrenics could be established, beginning with cases in which, despite the presence

of schizophrenic symptomatology, other admixtures are most outstanding, and ending with a group which approximates mostly the structure of schizophrenia.

5.   The importance of psychogenic precipitating factors and of clouding of consciousness in the clinical pictures was revealed in the majority of cases.   Physical precipitating factors were considered not more than subsidiary, as all exogenously-conditioned cases had been discarded from the beginning.

6.   The onset of the psychosis was acute or subacute in all cases, except in the group resembling atypical depressive states, where the onset was either gradual or subacute.

7.   The average duration of the psychosis was seven and one-quarter months.   Substantial improvement had occurred in nearly all cases before discharge from the hospital.

8.   Cyclothymic extraversion and certain psychopathic traits (lability, infantile and neurotic attitudes) were much more frequent and more marked than any other personality features.   Pyknic physique was present in a little more than half of all the cases.

9.   The incidence of manic-depressive psychosis was four and one-half times greater than that of schizophrenia in the hereditary background of the recovered patients.

10.   The distribution of sex and intelligence revealed no definite trends.

<center>ACKNOWLEDGMENT</center>

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PSYCHOSES ASSOCIATED WITH ESSENTIAL HYPERTENSION*

BY MORRIS D. RIEMER, M. D.

It is generally well recognized that excitement will produce a temporary rise of blood pressure. The tension present in visiting the doctor's office, taking an examination, or participating in a contest are various situations which have been reported to produce an increase of several millimeters in the sphygmomanometer reading. This phenomenon, however, is not universal and is more likely to be present in the neurotic individual. Accompanying this manifestation, symptoms of anxiety are usually observed objectively or experienced subjectively.

Recent studies have further emphasized the functional counterpart in hypertension, pointing particularly to the elements of suppressed hostility and general passivity. The submissiveness of the hypertensive does not permit him to give full overt expression to his extreme hostility—as a result of this, he reaches an impasse with a viciously created system of intensified hostility, which not infrequently will overflow into a temper outburst but usually seems to find some somatic expression in the hypertensive state.

Katz and Leiter[1] describing a hypertensive personality observed the frequent presence of an "excessive autonomic response to minor emotional stimuli, a choleric temperament and increased psychomotor activity." Saul,[2] studying the hostility in cases of essential hypertension, found "deeply ingrained and repressed problems intimately organized into the whole personality." He stated that "whether or not the progressive rise in the level about which the blood pressure fluctuates is connected with progressive organization of the personality into a less flexible form, and what the interrelationships are is a question of great theoretical as well as practical importance." Alexander[3] believes that the hypertensive patient differs from other neurotics in "his inability to relieve freely either one of the opposing tendencies . . . he cannot freely accept the passive dependent attitude or freely express the hostile impulses. A kind of emotional paralysis can be observed which results from the two opposing emotional attitudes blocking each other." Menninger[4] says, "it is common to find in the his-

tories of essential hypertensives that in childhood they have been thrust prematurely into situations of self-reliance."

Considering these findings, a study was undertaken of a number of hypertensive psychotics to determine some of the underlying psychological phenomena. A number of these patients could not be satisfactorily studied because of advanced somatic changes, emotional deterioration, or inaccessibility. Three of five cases studied by the writer are reported in detail to demonstrate certain clinical features. The patients selected are classified usually as suffering from essential hypertension, because of the absence of marked or permanent detectable organic damage. The objectives of this paper are to report particular symptoms and reactions which seem to be present in the hypertensive psychotic, to correlate these with the literature on the subject, and to discuss some possible etiological factors of this disorder.

All these patients displayed a covert or manifest hostility; the latter became more apparent in the periods of excitement from which they suffered, the former in the slowly emerging ideas of reference and feelings of being unwanted which were elicited only after prolonged psychotherapeutic efforts. Four of the five patients were prematurely thrown into situations of self-reliance.

CASE MATERIAL

Case 1. The first case is that of J. A., aged 24, admitted to the Brooklyn State Hospital January, 1939, because he became abusive and threatening toward his mother. The family history is interesting: The father died in 1927 of uremia at 39; he had had high blood pressure for five years. The mother has suffered from high blood pressure for over 11 years. The maternal grandmother and two maternal aunts had suffered high blood pressure; one died at the Brooklyn State Hospital. The maternal grandfather also was a hypertensive and died of an apoplectic stroke. There are six siblings in this family, all of whom are suffering from symptoms of severe neuroses; the patient is the oldest.

The patient is described as having been an active child. At 18 months he had a rupture. This was operated upon at the age of 11. At 10 he suffered from St. Vitus dance. He received an award upon graduation from grade school. During the third semester in

high school he began to fail in his work. At the age of 16 he applied for a position but was told he had high blood pressure (the pressure was 180). He had previously been employed by the Western Union and by a printing company. He began to complain of revolving sensations in his head.

His present state began five years prior to his hospitalization. His mother said he dwelt on "funny" ideas. He said that anyone who worked was "crazy"—that "God gave us everything." He began to show a marked hatred toward his mother. He had periods of excitement, pushed his mother aside, and complained that everyone was selfish. Two years before his hospitalization, he was arrested for indecent exposure.

This patient exhibits a peculiar heavy type of gait. He himself complains of feeling "logy." He often gives the impression of walking as in a slow motion picture. He usually has a rather serious, slightly disgruntled facial expression, and a furrowed brow. He keeps to himself and spends much of his time praying or reading the Bible. Physical examination reveals a systolic blood pressure which has reached 284, with an accompanying diastolic pressure of 130. Occasionally the readings will vary 40 to 50 millimeters of mercury. The systolic pressure drops occasionally to 180. Under psychotherapeutic treatments his pressure will drop more often; these drops have occurred five to six times a month, whereas previously they took place once or twice a month. On one occasion the reading dropped to 136 systolic. His eyegrounds show distended veins and mildly sclerotic blood vessels; no hemorrhages have occurred. The urinary picture varies: It may be negative for weeks at a time, then at other intervals shows albumin and casts. The blood picture is negative. Mosenthal and phenolsulphonphthalein tests show fairly good function.

The patient feels that his blood pressure rises when he is worried and hateful. Those about him appear to be hateful, therefore he keeps to himself to obtain relief. It is for relief that he prays to God. When his mother visits he becomes excited because "she is a hateful person." He is much better when he finds someone whom he considers "a little friendly." He relates experiencing most peculiar feelings within himself as if he were trapped and could

not escape from the room he is in although he pushes—this is accompanied by general sensations of helplessness.

For a number of years he has had a feeling that there is no solidity to the objects about him, so that he can put his hand through the wall or desk as if they did not really exist. It appears to him also that human beings are not solid. He has been puzzled about the retinal image and has been eager to find out how the inverted image finally straightens itself out; in this way, he reasons, he might be able to get over his confusion.

On the two occasions when he attempted coitus, he was impotent. At the time he exposed himself he had first urinated, then experienced the feeling that he didn't care if he were arrested.

Case 2. H. K., a white adult female, 29 years of age, entered the Brooklyn State Hospital, October 20, 1939. While being treated at the Mt. Sinai Hospital for hypertension, she was overactive and impulsive. She continually exposed herself, was meddlesome, noisy, and had an idea that the chocolates her brother sent her were poisoned.

On admission to the State hospital she was disturbed and had to be placed in a protection sheet. She asserted that the walls were talking to her, that her aunt had murdered her, and that she heard they were going to place her in a coffin. She continually gave expression to ideas of reference, saying that everyone was against her. Her cooperation for determination of her ideas was poor.

The history states her to be the oldest of five siblings. She was born in Russia and came to the United States at the age of two. Her mother died when she was seven. For the next two years she lived with a cousin in Canada. Her father remarried when she was 10. The family then contained two adopted daughters, and three children of the patient's mother.

The patient remarks that as far back as she can remember she had been conscious of a feeling of insecurity because she could not feel at home in any new place to which she was sent. As a youngster she was charged with taking care of the other siblings inasmuch as she was the oldest; she developed a feeling of responsibility for them. For the past number of years she constantly advised them, assisted them in their activities, and incessantly demanded that they follow her recommendations.

She came to New York alone, at about the age of 16, and found employment there as a clerk. She later worked in a New York social service office. She has experienced three psychotic episodes. The first occurred nine years ago when she was 20 years old. She was sent to Kings County Observation Ward after attempting to jump from a window, intentionally inhaling illuminating gas, and cutting her left wrist. She was inordinately self-absorbed, seclusive, pursued a self-accusatory trend of thought, and experienced a sense of inadequacy. She was removed to a sanitarium, where she remained for about two weeks; throughout this period she was inaccessible. While there she developed a rectal fistula.

For the next four years, she was able to remain out of the hospital and to find employment. In March, 1936, she was again admitted to the hospital with complaints that she was extremely tired, unable to work, and despondent over the fact that a man who had paid her attention had disappeared. She became overtalkative and difficult to manage. Her second period of hospitalization lasted nine months.

After leaving the institution, she seemed to get along fairly well and was able to maintain a position for over three years as a social service secretary. She was admitted to the Mt. Sinai Hospital, October 13, 1939. There she was somewhat immodest, tended to stare off into space and to perform foolish mechanical acts. Her blood pressure was 170/110. The urine showed a trace of albumin, with occasional red and white blood cells. An electroencephalogram showed no definite abnormality; her basal metabolic rate was plus 4; urine concentration test showed a maximum specific gravity of 1.022.

There was no previous history of hypertension. At the time of her admission to the Brooklyn State Hospital, she had a blood pressure of 180/130. Her urinary findings showed coarsely granular casts and positive albumin, but within a few weeks her urine was negative. The blood count and blood chemistry showed normal findings. Eyeground examinations showed no hemorrhages, and no pathology except for distended veins and indentation where crossed by arteries.

She continued to be notably disturbed for one month after admission; during this time she repeatedly disrobed. Following this,

for a period of six weeks, she expressed many hypochrondriacal complaints. She seemed to feel that possibly someone was interfering with her thinking. With the subsidence of her general excitement her blood pressure fell to 138, although for a period of several months following admission it was between 170 and 160. Since the drop in the reading, her systolic pressure has fluctuated between 128 and 138.

Since February, 1940, she has been much more tractable, cooperating better to psychotherapeutic treatment. It has been noticed that she has a peculiar "offish manner." Her voice is monotonous She is withdrawn, yet does not give the appearance of being unfriendly. Her hypochrondriacal complaints have gradually diminished. During interviews she shows argumentativeness and some distrust.

The most striking element in this patient's general reactions is the withdrawal affected in her demeanor, attitude, facial expression, and voice. She talks considerably during interviews, but gives little information about herself; often she is wrapped up in her thoughts. She has been going out on visits with relatives, who report that she has been argumentative, interfering, stubborn, and tending to domineer them. She refuses to be balked in anything she wants. She reacts in a hypersensitive manner. When asked why she had continually exposed herself, she stated that she had merely felt warm and had felt an urge to remove her clothes.

Case 3. C. W., a white female age 40, was admitted with a pressure of 180/100. She has had three admissions since 1937 to the Brooklyn State Hospital. She complained of insomnia, dizziness, and feelings of apprehensiveness. In one of these dizzy spells, she fell on the ground and sustained a fracture of the nose. She fell a number of times because of dizzy spells. The patient has shown alcoholism for over four years. A brother of the patient is alcoholic.

Her difficulties arose apparently at the time she began to imbibe excessively. As the years went on, she showed a poor tolerance for alcohol. She frequently spilled iodine on her dress and threatened to commit suicide. At the time of her second admission to the hospital, in the summer of 1938, she attempted to inhale illuminating gas while five members of her family were asleep in the house.

When the ambulance was called, although she appeared to be in an unconscious state, she suddenly rose and ran out of the house.

During her hospital residence she has been of extremely tearful disposition; at interviews she weeps and sobs continuously. She states that whenever she attempts to do anything she "goes to pieces." Her mind constantly reminisces about events which happened years ago. She reports experiencing extreme guilt feelings over the fact that she did not put a stone on her mother's grave, that she did not tell her mother the cause of her brother's death, that she had lived with her husband and become pregnant prior to her marriage; the latter she fears her child will find out. She also feels guilty that she neglected her children as a result of alcoholism within the last four years. She exhibits a well-defined trend directed primarily against her husband; he "picked on" her, and went out with a "dirty woman" from whom he caught a disease, because her children obtained rashes later on. Whenever she bore him a child she claims he said it was not his. She fears her husband and has used alcohol to bolster herself up "to withstand his constant abuse."

She had been in a hypertensive state for three months prior to her hospital admission. She entered with a blood pressure of 180/100. This soon dropped to 150/100 and has remained so since her admission in January, 1940. Her systolic pressure often fluctuates from 140 to 155. The urinary findings vary: At times albumin and casts are present, usually the findings are negative. Her renal function and fundi reveal no marked changes. At times she is extremely evasive and secretive. She has developed a peculiar oversolicitous manner and resorts to sobbing when she is interrogated, so that her tearful state seems to interfere with the expression of her thoughts. She is tense, has a tremulous voice, complains of some general anxiety, and constantly seems to be "holding herself in." When confronted for the first time or on the ward she has a slightly aloof, indifferent or unconcerned manner.

DISCUSSION

The cases worked with were all diagnosed as dementia præcox. The manifest psychotic picture as described and seen in these hypertensives is as variable as the protean appearance of schizo-

phrenia. No readily recognizable mental symptoms can immediately be pointed out as pathognomonic of this disorder. After a fairly prolonged study of these patients, however, certain findings more or less common to all are detectable.

These patients all showed some form of exhibitionism. The first man was arrested for exposing himself. The second patient repeatedly disrobed during her excited spells, and was described in various hospitals as immodest. The third patient while in her alcoholic debauches displayed herself by her flaunting behavior, undue gayety and gambling tendencies. Likewise the sexual life of the patients studied was grossly deformed. Two males were impotent. The unmarried female studied has not experienced any sexual intimacies, nor has she any strong cravings for romantic or sensual love. The other female patients were frigid.

Saul[2] observed that a number of his patients became sexually promiscuous and alcoholic, apparently in rebellion against their parental attachments, and that those with the freer outlets had lower blood pressure levels. The exhibitionism already described similarly may be an attempt on the part of the patients to relieve the inward tension through impulsive attempts at gratification.

The arrested expression of underlying feelings in these individuals is frequently reflected in their gait and facial expression. They seem to walk slowly, steadily and heavily. In their facies one can discern some confusion, uncertainty and a lack of freedom.

The passivity mentioned by Alexander[3] again is a feature observable in many neuroses. It is pronounced in the hypertensive, but here once more it is a suppressed passivity, i. e. the patient denies any desire to submit to another person; it is apparent, nevertheless, in his behavior. Such a patient waits for the next person to say something; only after much cajoling and urging does he express a few thoughts. He shows no spontaneity: He passively follows directions or the course of events in his environment without realization that he is submitting to those about him. Inertia, an apparent stolidity, increased awe, and lack of responsiveness may be signs of his general passivity.

Katz and Leiter[1] report that the hypertensive often has an exaggerated sense of conscience and strives for perfection. In this series of cases a reaction of this type was invariably found and

was given expression in the form of strong feelings of guilt or self-blame.

The patients studied fall into two classes: The first shows hypertension for a period of months, varying from three to six months or longer, accompanied by excitement and agitation; then occurs a drop of blood pressure with the subsidence of the overactive period. The second class fails to show this period of excitement and shows more or less continuous elevated blood pressure. Of the five cases worked with, three were in the first group, two in the second.

During the period of elevated pressure, hypertensive individuals suffer headaches, dizzy spells, and tinnitus. Extreme hostility is generally shown; in those patients having periods of excitement, this is manifest in vague paranoid ideas or ideas of reference, general open scorn, irritability or resentment. In their subsequent subdued state they continue to show a more covert form of hostility, faultfinding tendencies, argumentativeness, and complaints of being misunderstood. The first patient constantly believes he is surrounded by hateful people who, he feels inwardly, cause his blood pressure to rise; an occasional likable person, retiring into solitude, or praying "helps the blood pressure." He says that he has always been in a "hateful" home—his mother is a "hateful person" and the only comfort he could find was to "walk and get away from everyone," since he could not get up and tell his mother what he thought of her; when he finally mustered the courage to speak back to his mother she called the ambulance and had him sent to the State hospital. He often thinks that if only he can find kind people about him, he will be "all right."

It should be mentioned at this point that hostility *per se* is not brought forth as a particular characteristic of this disorder, since there is no neurosis where one cannot find hostility. It seems, rather, that the relative inextricability of the patient from his hostility by virtue of its suppression and repression, with his inability to divert it in any other way, plays an important rôle in the hypertensive state. Another point of interest is that these patients do not freely express their delusional ideas. It is only after many interviews that one can elicit an underlying trend. Misanthropic delusions, as indicated in the content of the patient who felt every-

one about him was hateful, are commonly an undercurrent of their ideation.

In the first class of patients, who suffered a period of excitement, the later diminution in the blood pressure reading was accompanied by ability to throw off some hostility and anxiety during the agitated phase of the illness and to develop immediately following this defensive measures to ward off extraneous influences which aroused anxiety or hostility within them. This defense the second and third patients showed by becoming somewhat indifferent, aloof, subdued, also by a more apparent external cooperativeness to win approval of the ward personnel.

Another item of importance seems to be the relative inability of these individuals either to show outward signs of anxiety or to experience it inwardly. The patients falling into the first group, however, as already indicated, are able to give forth some anxiety and hostility during the excitatory period. The third patient, the one revealing alcoholic features, came nearest to demonstrating frank anxiety but constantly restrained herself through the device of sobbing at frequent intervals; however, she showed no unusual embarrassment of breathing, did not complain of choking up or palpitation. Varying degrees of depersonalization may be present; in these individuals it seems to serve as a defense against anxiety.

In the psychotics studied for this presentation, a hypertensive state appeared when the patient was unable to prevent himself from experiencing anxiety, and ceased when defensive measures were developed to avoid most reality-producing or anxiety-producing situations. In the patients followed out here the anxiety itself was rarely apparent; rather, the hostility, which is a direct defense against anxiety, was the most detectable affect.

According to Alexander,[3] essential hypertension develops when circumscribed neurotic symptoms which serve for the draining off of pent-up hostile impulses are absent. This assumption is substantiated by such observations as that of Draper,[5] who observed the return of a longstanding elevation of the blood pressure to the normal, coinciding with the patient's development of certain neurotic symptoms. These observations would fit in with those found in Group 1, where a return to normal blood pressure is associated with the production of new defense measures or symptoms.

Most workers believe that the suppressed hostility is responsible for the rise in blood pressure. One must not forget, however, that hostility is a defense reaction set up against anxiety. The latter, like the hostility, is likewise suppressed in these patients. It is not the purpose of this paper to enter into a theoretical discussion of the question whether the anxiety or the hostility is the primary provocative factor. Suffice it to say that as far as can be seen, both are held back in the hypertensive, and from all observations on the *modus operandi* of defense mechanisms, anxiety is considered the most fundamental agent against which the psyche must protect itself.

All these patients, as in other cases of dementia præcox, were constantly deprived throughout their childhood of a vital health-giving constituent, that is, parental love. The absence of this life-giving factor to the child leads invariably to the development of anxiety, which in turn provokes all sorts of protective devices to diminish or turn aside the anxiety.[6]

The prominence of hypochondriacal complaints, the focussing of all their attention upon themselves while wrapped up in their fantasies of a hostile or remedial nature, and the relative absence of sufficient interest in activities or objects outside themselves, point to an extremely overcharged narcissistic state in these patients. Strong narcissism is of course the dominant factor in dementia præcox and in the organ neuroses. The relationship to be stressed, however, is that the anxiety, hostility, and passivity brought out so strongly in the hypertensive disorder revolves about the patient's narcissistic needs, i. e., he seems constantly to be looking about for people to love and protect him. He is everlastingly striving to find that which was denied him in his childhood—adequate affection from his parents—and with the least deprivation of any kind, he becomes anxious and hostile. This course of events was especially evident in the patient who felt he wanted friendly, kind people about him to help his blood pressure.

It has been noticed that these patients do not elaborate an extensive delusional system, but rather show a relative paucity of fantastic ideational formation. Perhaps it is this diminished facility of thought or imaginative productivity which affords these individuals less of an outlet in this direction, so that they are compelled to turn their disturbing feelings inward for expression.

This, coupled with possible constitutional factors localized in the cardiovascular system, opens the path for the building-up of a hypertensive state.

Conclusions

1. The psychotic manifestations of hypertensives are variable.

2. A slow heavy gait, a markedly restrained-looking facies, exhibitionism and a grossly defective sexual life are present in these cases.

3. Strongly suppressed anxiety, hostility, passivity, and feelings of guilt are evident.

4. These cases fall into two groups:

Group 1: Where the hypertension subsides after several months as a result of a period of excitement wherein some anxiety and hostility are given off and the patient later develops defensive measures to separate himself from extraneous influences which induce anxiety or hostility.

Group 2: Where the hypertension does not subside. In these patients there are no distinct periods of excitement, and the hostility or anxiety continues to be markedly suppressed.

5. The conflicts in the hypertensive psychotic have a narcissistic basis.

6. These patients seem to have a diminished faculty for thought or ideational elaboration and, failing to find sufficient outlet in this way, probably seek somatic expression through the cardiovascular system.

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BEHAVIOR CHARACTERISTICS OF SCHIZOPHRENIC CHILDREN*

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Although schizophrenic psychoses and schizoid personalities†
are known to occur in children,[1-5] remarkably few attempts have
been made to enumerate the particular characteristics which spe-
cifically distinguish such conditions from other forms of childhood
maladjustment. The present inquiry was undertaken as a prelim-
inary step toward making such an enumeration. It is hoped that
this will clarify the diagnosis of these disorders, and that the re-
port of a series of cases will encourage a more orderly and coher-
ent arrangement of data.

In this study attention has been focused on such overt activities
of children as can be observed, described, and recorded from an ob-
jective point of view. A tentative list of the behavior symptoms
which are found on this superficial level has been prepared in the
hope that it will assist the clinician in distinguishing children of
the schizophrenic type from those who are maladjusted in other
ways.

MATERIAL AND METHODS

The basis of the present work has been the observation of 14
children, four of whom suffered from actual schizophrenic psycho-
ses, and 10 who—though not so extremely maladjusted—showed
evidence of schizoid personality. These 14 patients were part of a
larger group of 138 children under 13 years of age who, because of
severe behavior disorders, had been admitted for hospital treat-
ment to the Emma Pendleton Bradley Home, East Providence,
R. I., over a period of several years. While these children were re-
ceiving thorough medical and psychiatric attention in the Home,
their daily life included a full quota of activities suited to their
ages. This included classroom work and tutoring in school sub-
jects, a recreational program of sports and games, daily tasks on
the hospital wards, participation in hobby groups and the use of a

†In this report "schizophrenic" is arbitrarily used in discussing matters directly pertaining to an
actual psychosis—schizophrenia. Following what appears to be common clinical usage in the United
States, the adjective "schizoid," is employed to describe conditions which in general resemble schizo-
phrenia without necessarily implying specific attributes of the sharply delineated personality types
depicted by Bleuler and by Kretschmer.

children's library. At all times, they were under the supervision
of physicians, teachers and nurses. These adults, trained in work-
ing with children, had opportunities for daily contact with each
child over periods of weeks and months at a time in a setting rea-
sonably free from the artificial distractions of a laboratory or of
conventional hospital surroundings. The observations of this staff
form the basis of conclusions expressed herein.

The 138 children under general consideration were, with few ex-
ceptions, of normal intelligence; and they presented a considerable
variety of behavior difficulties and educational problems. In ad-
dition to the 14 schizophrenic and schizoid patients, the group in-
cluded children with convulsive disorders, who showed the hyper-
active, aggressive, variable characteristics of the epileptic. Some
of the children had been delinquent, in terms of stealing, truancy,
sex play and the like. Some were victims of tics and habit spasms,
others of anxiety states; and a few were poorly adjusted on the
basis of specific reading disabilities. The present status of psychi-
atric diagnosis in childhood scarcely warrants a painstaking sub-
division and classification of these 138 patients at this point. How-
ever, as a standard for comparison and contrast between schizo-
phrenic and otherwise maladjusted children, this large group fur-
nishes a useful and comprehensive sample of heterogeneous be-
havior disorders.

The clinical diagnosis of each of the 14 children designated as
schizophrenic or schizoid was agreed to and endorsed by all experi-
enced members of the hospital staff. The exact diagnostic criteria
employed by various observers were, however, inconsistent and
were variable for each child. Some of the staff placed these pa-
tients in this small group because in some general way their be-
havior resembled that of adult schizophrenic patients. Others
made their diagnoses because the children showed evidence of
withdrawal from, or impaired contact with, their surroundings.
Because of this variability of opinion as to what constituted the
most important elements of schizophrenic and schizoid behavior,
difficulty was encountered in systematically comparing patients
clinically.

To remedy this, an attempt was made to list the outstanding be-
havior characteristics which were capable of objective description

by adult observers in the 14 children. Only such conduct as could have been described by a person who was entirely unfamiliar with the background and development of each child was included. The personal opinions and sentiments of the children were not consulted, lest some child's behavior be influenced by realization that he was an object of special scrutiny.

It was possible to list a large number of overt characteristics for each of the schizophrenic and schizoid patients, but only a few such traits were common to the majority. These few traits were tabulated, and their presence or absence in each of the remaining 124 behavior problem children was independently listed by several members of the staff who had been personally acquainted with all of the patients. By eliminating from further consideration the traits which were as prominent in the entire group as they were in the schizophrenic and schizoid patients, a smaller number of characteristics remained which were thought to be peculiar to these latter children. The results of this investigation follow.

Results

Significant Traits

Eight behavior characteristics capable of objective description were especially prominent in the children diagnosed as schizophrenic or schizoid. These, arranged in order of frequency and importance, were:

1. Seclusiveness.
2. Irritability when seclusiveness was disturbed.
3. Daydreaming.
4. Bizarre behavior.
5. Diminution in number of personal interests.
6. Regressive nature of personal interests.
7. Sensitivity to comment and criticism.
8. Physical inactivity.

Blunting of affect and apathy such as are seen in many adult schizophrenic patients were not prominent in these children.

To avoid subsequent confusion a working definition for each of these attributes was evolved.

Definition of Traits

Seclusiveness: This has been defined as ''a tendency, frequently pathological, of an individual to cut himself off from social intercourse.''[6] Seclusiveness in this sense is relatively easy to observe and describe without reference to a child's subjective feelings. In connection with the present study, children were considered seclusive only if there were no known constructive reason for such conduct. Under this consideration, the term does not apply to individuals who keep to themselves for purposes of work, study, reading, hobbies or other profitable pursuit.

Irritability: This term has been non-technically defined as ''very susceptible of impatience, anger, or passion.''[7] Irritability is characteristic of many problem children, but here is considered significant only as immediately related to seclusiveness, that is to say, on such occasions as a child becomes particularly angry whenever interruptions disturb his solitary activities. Used in this sense, this characteristic can be noted objectively.

Daydreaming: Daydreaming may be thought of as ''wishful or purposeless thinking during waking life which takes the form of long trains of uncontrolled and fanciful imagery or of imaginary adventures.''[6] Just as seclusiveness is regarded as a sign of maladjustment when it is used for no profitable purpose, so daydreaming is rated as pathological because it is nonproductive. Children who daydream are thus distinguished from those whose thoughts are preoccupied with practical plans for tangible enterprise. Daydreaming is most conspicuous when it distracts attention from tasks at hand. Its presence must be diagnosed by inference, since the content of one individual's thoughts can rarely be gauged by another. Since daydreaming is more common among children than among adults, criticism is frequently directed to its inclusion among pathological symptoms in maladjusted children; and in spite of its prominence as an objective symptom, it is not so reliable as some of the others under discussion.

Bizarre Behavior: Bizarre may be defined as ''characterized by unnatural, extravagant or sensational contrast.''[7] As applied to the behavior of children; it describes conduct which is out of keeping with their surroundings, particularly when the contrast is gro-

tesque or dramatic.   Bizarre behavior in childhood may embrace such activities as the assuming of strange postures, the wearing of inappropriate costumes, the mimicking of sounds made by animals, the repeated playing by older children with urine and faeces, unusual absorption with small sticks, stones, bits of paper or parts of the body, compulsive activities, such as the repetition of purposeless rituals, and other incongruous performances.

Diminution in Number of Personal Interests: The number and variety of major activities which a child pursues may be compared with those of other children of the same age and development. Intelligent children usually busy themselves in so many different ways that a persistent diminution of personal interests is conspicuous to all but the most casual observer.

Regression of Personal Interests: Regression is employed here in a modified psychoanalytic sense, referring to "a tendency on the part of the libido to refer to some channel of expression which belongs to an earlier phase of the libido development."[6]   When a child's play interests, among other things, appear to be at a level suitable for much younger children, he may be said to be expressing regression of interests. Episodes may occur where the immaturity of a child's interests and actions may be so incongruous as to warrant their inclusion also under the category of "bizarre behavior."

Sensitivity to Comment and Criticism: An individual who is sensitive in the usual psychiatric sense is "very openly or acutely affected by external impressions especially by those made by the mood or opinions of others in relation to one's self."[8]   The common loose usage of the term to describe sensations and feelings weakens its significance as a specific personality characteristic. We use it to describe accentuated emotional reaction to praise, blame and other opinions expressed by a patient's associates. Signs of blushing, embarrassment, weeping, expressions of anxiety, panic or fear, in relation to situations which may not justify these responses, are taken as evidence of sensitivity.

Physical Inactivity: Most children are more strenuously active than are adults, so that diminution or absence of this expenditure of physical energy is conspicuous and usually easy to describe.

When this occurs, the expression "physical inactivity" may be employed.

ILLUSTRATIVE CASE REPORTS

To illustrate the feasibility of recording in concrete and orderly fashion the personality traits which seem significant in the schizophrenic and schizoid children, brief case reports will be presented. The first four patients were considered definitely psychotic because their behavior disorders were not only persistent and progressive but were also of sufficient severity as to color all their reactions to the world about them. In view of the psychotic condition of these individuals, a diagnosis of schizophrenia seemed warranted. This disorder is extremely rare in children before the onset of puberty. The rest of the children appeared to suffer from the same general type of disturbance, but to a lesser degree. Their relationships to their surroundings were not completely influenced by their disorders, and in certain instances their adjustments improved. Their difficulties were not sufficiently intense and all-inclusive to be classed as psychoses; and the diagnosis of "schizoid personality" was preferable.

To give a brief, clear exposition of each child's significant behavior many details of early history and development have been omitted. This is done with full recognition that a survey of such details is essential for diagnosis and for a comprehensive understanding of the disorder known as childhood schizophrenia.

Patient 1.   Alice was admitted to the hospital at the age of nine years because of repeated asthmatic attacks and strenuous displays of temper since the age of four. She had always preferred the company of younger children. Her physical status was essentially negative and her intelligence quotient was 95 on the Stanford-Binet scale.

Whenever possible the child preferred to be alone in her room with the door closed or by herself in isolated parts of the hospital grounds (seclusiveness). When children or nurses attempted to join her she slammed the door, grimaced, or petulantly ordered them away (irritability). In school she seemed preoccupied with her own thoughts and out of touch with her surroundings, to the detriment of her academic work (daydreaming). Alice grimaced frequently, assumed and held incongruous postures, "flounced about" with an awkward gait and periodically failed to respond when spoken to (bizarre behavior). Her time was entirely occupied with day-

dreaming and reading to the exclusion of usual childhood play activities (diminution in number of personal interests). However, the books she read and the sedentary activities she pursued were appropriate for her age (no regression of personal interests). Alice responded to comments about herself by blushing or casting down her eyes; she cried easily when scolded concerning deficiencies in conduct or school work. These and other episodes, as illustrated by Alice's crawling on hands and knees to her place at the dining room table—to avoid the scrutiny and comments of other children when she entered the dining room late one day—are examples of this child's extreme sensitivity to comment and criticism. Most of her voluntary activities were of a sedentary nature and included reading, knitting, and working over picture puzzles (physical inactivity).

Habits of seclusiveness, irritability, posturizing and mutism gradually increased in severity over a six-year period until they dominated all of Alice's behavior. So completely altered was her contact with her surroundings that a diagnosis of schizophrenic psychosis seemed justified.

Patient 2. Beatrice was nine when she was admitted to the hospital with a history of severe temper displays and stubbornness which dated from the birth of a sister when Beatrice was 18 months old. She had subsequently suffered repeated physical illnesses. Continued social maladjustment had been treated without success in various hospitals and schools. Her physical condition on admission was excellent and her Stanford-Binet intelligence quotient was estimated—in the face of poor cooperation—at 73.

During the year's observation Beatrice was noted to gravitate toward her own room where she could be alone, or to stand apart from other children in a corner playing with her fingers or talking to herself (seclusiveness). Whenever she was interrupted in such play she cried, "Please leave me alone; I'm playing pretend," and became obviously angry with the intruder (irritability). Beatrice constantly appeared immersed in her own thoughts, often conversed with imaginary companions and paid little attention to what went on about her (daydreaming). At times she made no response when addressed or interrupted, remained mute for long periods, and maintained grotesque postures reminiscent of adult catatonic patients (bizarre behavior). This girl spent all of her time in solitary play, talking to herself and to her imaginary companions to the exclusion of group activities and childhood games (diminution in number of personal interests). Beatrice often soiled herself, played with her faeces, openly masturbated, demanded that she be spoon-fed or used her hands rather than appropriate table utensils, wilfully removed her clothing and when excited jumped about like a nursery school child (regressive nature of personal interests).

She seemed oblivious to the remarks or remonstrances of others in regard to any of her actions (no sensitivity to comment or criticism). Although usually by herself she was by no means quiet or relaxed, but often danced and skipped about, climbed over the fixtures and furniture, and seemed to enjoy performing gymnastic contortions (no evidence of physical inactivity).

Beatrice appeared to experience auditory hallucinations at times. Her unusual conduct completely dominated all contact with her surroundings, rendering satisfactory social adjustment impossible. The diagnosis of a schizophrenic psychosis was made.

Patient 3.   Charles was admitted to the hospital at the age of eight because of uncontrollable hyperactivity and failure to mingle with other children since infancy. Physical examination was negative except for strabismus and a speech defect. Despite poor cooperation a Stanford-Binet intelligence quotient of 73 was obtained.

Over a four-month period of observation it was noted that Charles always preferred to be alone, characteristically remained apart from groups of children and focussed his attention upon small sticks, strings, blocks, or bits of paper. Whenever possible he wandered into the quiet, dimly-lighted sub-basement of the hospital to play by himself (seclusiveness). When interrupted in these activities, or when the arrangement of his playthings was altered by another child, he would lie down, scream loudly, curse, and occasionally hold his breath in a temper display (irritability). He was frequently seen staring into space for long periods of time, regardless of where he was, and apparently was deep in thought (daydreaming). At times he spoke rapidly, intermingling meaningless words and neologisms with snatches of coherent conversation. At other times he sang nonsensical and inappropriate songs. He often picked up and smelled objects about him (bizarre behavior). Most of his play was with small objects such as sticks and blocks or with parts of his body, and he was unconcerned with the many opportunities for normal play which were constantly present in the hospital (diminution in number of personal interests). Much of his almost infantile play consisted of building towers of blocks and knocking them down, tossing up bits of paper and becoming excited as they fluttered down around him (regressive nature of personal interests). He paid no attention to the opinions expressed about him (no sensitivity to comment and criticism). Although his play was solitary he intermittently rushed about impulsively, or danced around by himself (no physical inactivity).

Charles' behavior varied from day to day. He had three severe grand mal convulsions during his stay in the hospital. Because of the severe

nature of his maladjustment and his completely altered relationship with his surroundings, he was considered to be suffering from a schizophrenic psychosis coincident with or secondary to a convulsive disorder.

Patient 4. Gwen was admitted when eight years old because she had shown a persistent aversion to other children since late infancy. More recently she had been destructive of playthings, soiled herself wilfully, and openly masturbated in school where her academic progress was poor. Physical examination was entirely negative, and Gwen's intelligence quotient on the Stanford-Binet scale was 86.

This child wandered away from others whenever possible, and did not converse with them even when in a group. She frequently stood behind the door of her room muttering to herself, or lay on her bed motionless with eyes half closed and a rapturous expression on her face (seclusiveness). When interrupted she scowled and expressed her displeasure in no uncertain terms (irritability). In the schoolroom she frequently paid no attention to her work, but sat for long periods with closed eyes, or gazed into space, much as she did when alone in her room (daydreaming). She assumed unusual postures for long periods of time such as lying on the floor, legs uplifted and spread apart exposing her underwear regardless of who might be observing her. She urinated out of the window or in shoes, defecated in her locker, grimaced, and at times refused to respond to questions. On other occasions, when conversing with an adult, she burst into paroxysms of weeping in which tears were conspicuous by their absence (bizarre behavior). Although her conversation indicated that she was aware of what was going on about her, she rarely paid obvious attention to anything except her own solitary and peculiar performances (diminution in number of personal interests). Her bizarre excretory activities, considerable masturbation, carried on both when alone and in the presence of others, and the fact that she played for long periods with her fingers and other parts of her body were pursuits which indicated that her interests were regressive in nature. When censured by nurses for her conduct she sometimes cried and usually reminded the adult on a subsequent occasion that no one liked her, citing the fact that she had been scolded. She frequently interpreted the conversation of adults whom she could see but not hear as being critical of her actions and in many other ways appeared sensitive to comment and criticism. On the basis of the time she spent alone in her room, and her refusal to participate in any children's games she gave the impression of being physically inactive.

Gwen's behavior varied from time to time, but her social adjustment showed no sustained improvement. Her unusual and self-impelled reac-

tions altered her relationships with her companions and her surroundings at all times. A diagnosis of schizophrenic psychosis was made.

Patient 5.   Dan entered the hospital at the age of seven because of temper displays, persistent enuresis and physical attacks upon younger children. His physical condition was excellent and his Stanford-Binet I. Q. was 85.

When permitted, Dan preferred to wander away from any group with which he was playing and enjoyed roaming about in the woods by himself (seclusiveness). When attempts were made to dissuade him from these activities he became sulky, pouted, glared at the supervisor, and muttered under his breath (irritability). During school hours he gazed into space, and during leisure periods his attention seemed far from his surroundings (daydreaming). Dan was frequently observed striking and holding awkward postures, he growled like an animal when alone, and showed little obvious emotional reaction to situations and events which should have pleased him (bizarre behavior). He seemed to enjoy few activities beyond strolling about alone, daydreaming, and talking to himself (diminution in number of personal interests). On the rare occasions when he sought the company of other children he preferred to be with those much younger than himself, and often sought attention from them by using obscene language in a very immature fashion (regressive nature of personal interests). When praised, he blushed profusely and seemed obviously embarrassed, but he cried easily at the slightest scolding (sensitivity to comment and criticism). He rarely engaged in the boisterous games common to boys of his age and walked slowly instead of running (physical inactivity).

Over a period of five years, this boy changed very little, aside from developing an interest in his physical development which he attempted to cultivate by strenuous exercises carried out alone. His school progress became fairly satisfactory, and he took a minor part in most activities. He was thought to suffer from a schizoid personality. The diagnosis of psychosis seemed unwarranted in view of the fact that his adjustment to school and a few other activities was adequate.

Patient 6.   Ed was referred for hospital care when he was 10 years old as he seemed absorbed in his own thoughts while at school, and was gradually losing interest in playground activities. His physical condition was good except for moderate malnutrition. This boy's intelligence quotient was 84 on the Stanford-Binet scale.

Ed refused to join the other children in their sports and games, and hid in his room to avoid them. When out-of-doors he wandered about by himself (seclusiveness). If other children approached him at such times he struck them. When he was encouraged to join the group he muttered to

himself, appeared angry and often said to the nurse or teacher, "Get out of here, you sap, I don't care," (irritability). In the midst of a group, and particularly during school hours he seemed detached and immersed in thought (daydreaming). Occasionally Ed was found asleep wrapped in a blanket on the floor with his pajamas pulled on over his usual clothing. He frequently completely wrapped his head and shoulders in a blanket before retiring to bed in the dormitory. He was often observed walking about the corridors muttering to himself. These were characteristic evidences of bizarre behavior. Upon entering the hospital he seemed to be entirely satisfied with his solitary wanderings and daydreaming (diminution in number of personal interests). Except for occasional soiling and enuresis his personal interests did not appear regressive in nature. He was acutely embarrassed by any praise given him and responded by blushing and grimacing. His feelings appeared acutely wounded by unfavorable remarks (sensitivity to comment and criticism). His quiet, daydreaming existence was in contrast to the energetic life of other boys of his age (physical inactivity).

During the first few weeks of treatment, Ed also was neglectful of his personal appearance and possessions; and he bullied younger children. Later, a gradual interest in sports supplanted this behavior; and during a period of two years his social adjustment slowly improved. A diagnosis of behavior disorder dependent upon a schizoid personality was made.

Patient 7. Frank was a 12-year-old boy whose lack of interest in other children and clumsiness in all physical activities brought him to the hospital. Examination showed him to be small for his age; there were no signs of puberty, and his body contours were distinctly feminine. One testis was undescended. His Stanford-Binet I. Q. was 108.

Frank's favorite activity was to remain in his room lying on the bed playing alone and talking to himself (seclusiveness). When urged to join games, he called the nurses obscene names, swore, stamped his feet and either refused to move, or ran and hid (irritability). In the school room, his attention seemed focused on his own phantasies; and when out-of-doors, he was oblivious to his surroundings and conversed with imaginary companions (daydreaming). Frank assumed peculiar gaits, struck weird postures, and at times very neatly defecated in out-of-the-way places within the building (bizarre behavior). He shunned the sports and social activities of other children (diminution in number of personal interests). His favorite playthings were small toy trucks, and toy airplanes suitable for children half his age (regressive nature of personal interests). He paid no attention to the remarks or opinions of children or adults (no sensitivity to comment or criticism). His seclusive existence was devoid of the running

about and eager participation in the usual activities of children of his age (physical inactivity).

Frank was observed in and out of the hospital for a period of four years, during which there were few changes in sexual development, motor coordination, or social adaptability. He conversed intelligently in spite of his immature interests; but he made little school progress, apparently because of his lack of attention and effort. A diagnosis of schizoid personality associated with an endocrine disorder was made.

Patient 8. Harry was admitted at the age of 10 because he had always preferred to play alone, failed to show interest in schoolwork, and had been observed fondling his genitalia in the school room. His physical status was negative, and the Stanford-Binet I. Q. was 112.

Harry preferred to play alone, puttering with small sticks or pieces of string (seclusive). When encouraged to do otherwise, he either became sulky and uneasy, or openly profane and resistive (irritability). Both alone and in the midst of a group of children Harry seemed engrossed in his own thoughts (daydreaming). When sitting on the toilet he often covered his head and face with his shirt, or draped a blanket over himself. Either in company or alone, he imitated the calls of birds and various animals or the sounds of airplanes or automobiles. At times on the ward he nonchalantly exposed and fingered his genitalia in view of others (bizarre behavior). His attention dwelt constantly on his own thoughts and solitary play (diminution in number of personal interests). His choice of small sticks, strings, or parts of his body as playthings suggested the regressive nature of his personal interests. When others remarked about his activities or praised or scolded him he blushed, tears came to his eyes and he appeared obviously ill at ease (sensitivity to comment and criticism). He failed entirely to run about in the fashion expected of healthy 10-year-old boys (physical inactivity).

Harry made good progress in school, and his social adaptability appeared somewhat better after two years of treatment. It was felt that his essential handicap was a schizoid personality.

Patient 9. Ira was referred to the hospital when seven years old because of occasional convulsive attacks and failure to mingle socially with other children. Physical and neurological examinations were negative. Ira's intelligence quotient was 109 on the Stanford-Binet scale.

This boy preferred to play alone and was frequently seen wandering by himself about the hospital grounds (seclusiveness). When summoned to school or to join the children, he would swear, lie down on the ground, kick, scream, and shower a stream of verbal abuse upon the individual who had

interrupted him (irritability). When supposedly taking part in a game, his face would have a vacant expression, and he would be intent on his own thoughts. Much of his time in school was also thus occupied (daydreaming). He observed many singular rituals, insisted that he could not move his bowels unless he took a certain book to the bathroom, was obsessed with obtaining wheels of all sorts and sizes for playthings, and with arranging them in various absurd combinations which he insisted were "inventions" (bizarre behavior). He showed little enthusiasm for anything except his preoccupation with fantasies and his absorption in the subject of wheels (diminution in number of personal interests). Since he retained his exclusive interest in wheels and small playthings during a period of five years in the hospital he may be said to have shown regression in the nature of his personal interests. The opinions of others affected him little if any (no sensitivity to comment or criticism). He kept himself so occupied with his solitary pursuits that he expended little of the physical energy expected in a young child (physical inactivity).

Ira had a few isolated grand mal convulsions during his first months in the hospital but these were subsequently eliminated by appropriate medication. There was gradual improvement in social adjustment and school progress was definite though slow. He was considered to suffer from a schizoid personality and a convulsive disorder.

Patient 10. Jack entered the hospital at the age of 10 with a history of overt sex play, the use of profane language, and general poor adjustment at home and at school. His physical condition was good and his Stanford-Binet I. Q. was 89.

Jack wandered away from the other children whenever possible, and always preferred to play by himself in the woods (seclusiveness). When urged to take part in activities he at first ignored nurses and teachers, and then responded in obscene and threatening language (irritability). In contrast, when isolated in bed with intercurrent infections, he seemed perfectly contented. His school progress suffered from the fact that he was persistently absorbed in his own thoughts rather than in the task at hand (daydreaming). He told fantastic and highly improbable yarns to the other children. He grimaced, and in the group or when alone he made sudden chirping bird-like noises or growled like an animal. At times he wore a pillow for a hat and indulged in other bizarre behavior. He showed little enthusiasm for the activities of the children (diminution in number of personal interests). Except for some of his bizarre antics his interests were not regressive in nature. When reprimanded he responded with swearing, muttered under his breath, and even threatened to kill whoever criticized

him (sensitivity to comment and criticism). His failure to participate in the sports of the children, and his lack of exuberant running about made him apparently physically inactive.

In addition to these outstanding traits, Jack was cruel to animals, and indulged in some sexual exhibitionism. His adjustment improved little after several months in the hospital and later he was involved in numerous delinquencies in his own community. A diagnosis of behavior problem based on a schizoid personality was made.

Patient 11. Karl was admitted at the age of 11 because of tantrums, truancy, property destruction, stealing and abundant tics and mannerisms throughout childhood. Physical status was negative except for poor nutrition. His intelligence quotient was 101 on the Stanford-Binet scale.

Karl's favorite activity was playing alone in his room with the door shut. He strutted about before the mirror in an animated fashion talking to himself (seclusiveness). He usually resented interruption of these activities, responded by roundly cursing the intruder, or by lying on the floor in a tantrum (irritability). In school, in his own quarters, and out-of-doors Karl seemed frequently deep in his own thoughts (daydreaming). At times he was observed apparently listening to imaginary voices in the wall. He sometimes wore heavy outdoor clothing, or his raincoat, in the building, and when alone he dressed in costume to play before the mirror in his room (bizarre behavior). In spite of the amount of time he spent by himself he progressed well in school, read many books, participated in dramatics, and except for failure to enjoy athletic sports, there was little diminution in number of his personal interests. The majority of the things with which he occupied himself were suited to his age and intelligence (no regression in nature of personal interests). He blushed easily and profusely when praised and cried at the slightest reprimand (sensitivity to comment and criticism). Although he avoided athletic sports and strenuous games, he was sufficiently energetic in other ways so that he did not give an impression of physical inactivity.

Karl's mood and conduct varied from periods of excellent social adjustment and amenability to episodes of stealing or truancy; and there were times at which he made many hypochondriacal complaints and showed various tics and mannerisms. On several instances he experienced what seemed to be true visual hallucinations. There was no consistent change in his behavior during three years of treatment at the hospital. A diagnosis of behavior disorder with schizoid personality was made.

Patient 12. Len was admitted to the hospital because of his tendency to avoid other children, and because of many compulsive rituals and evidences

of anxiety. The manifestations had become accentuated the previous year following a tonsillectomy and the coincidental death of his grandmother with whom he had lived. His physical examination was negative, and his Stanford-Binet I. Q. was 120.

Len periodically kept to himself, seemingly preoccupied with a variety of compulsions, and refused to associate with children (seclusiveness). When urged at such times to join the others in sports and games he was resistive, and repeated, ''I won't,'' in a petulant manner (irritability). When alone he habitually seemed deep in thought (daydreaming). Len indulged in many repetitive acts in all situations. These appeared to be compulsions, including verbal repetition of numbers, crossing of thresholds back and forth repeatedly when entering a room, flushing the bathroom toilet several times after using it, always touching surrounding objects with his fingers before sitting down, and similar peculiarities (bizarre behavior). During occasional periods when this boy mingled with others he appeared interested in a wide variety of activities, acquired and retained adequate knowledge of sports, books, and hobbies (no diminution in number of personal interests). All such affairs were quite appropriate for his age (no regression of personal interests). When praised or corrected he responded immediately, appeared embarrassed and took obvious pains to avoid such situations (sensitivity to comment and criticism). During the intervals when he did not avoid the company of others he entered energetically into athletic sports (he was not physically inactive).

This boy made a gratifying response to psychotherapy with elimination of all compulsive activity, and correspondingly good progress in school. He was still at times unexplainedly seclusive. His diagnosis appeared to be that of an anxiety neurosis, probably in a schizoid individual.

Patient 13. Mary first received hospital care at the age of 11 because of repeated attacks of nausea, vague abdominal complaints, and an uncontrollable fear that she might kill someone. Physical examination showed only poor nutrition. Her Stanford-Binet I. Q. was 136.

On all possible occasions Mary wanted to be alone in her room, usually to read (seclusiveness). When interrupted, she obviously resented the most tactful and sympathetic attempts to encourage her to join the other children, and quietly but firmly said, ''I won't'' (irritability). Alone, she was usually occupied with reading and in school showed excellent effort and concentration (no daydreaming). Behavior aside from her desire to be alone was strictly conventional (no bizarre behavior). On first admission she showed enthusiasm only for reading, but she rapidly increased the width of her activities (no diminution in number of personal interests).

These occupations were what might be anticipated in one of her years (no regressive nature of interests). Mary became emotionally upset when reprimanded, or when she knew that her conduct was being discussed (sensitivity to comment and criticism). In spite of her widening interests she continued to favor sedentary pursuits (physical inactivity).

Mary responded well to psychotherapy. Her fears and somatic symptoms disappeared as her range of interests widened. She was diagnosed as having suffered from an anxiety neurosis, but was also felt to be a schizoid child.

Patient 14. Nick was 10 years old when he entered the hospital because of truancy from school and home, petty stealing, and unwillingness to mingle with other children. His physical status was negative. An intelligence quotient of 96 was obtained on the Stanford-Binet scale.

Although a capable athlete, Nick frequently preferred solitude to activity, and remained in his room to read or to play solitaire (seclusiveness). When such occupations were interrupted he was saucy to adults, swore at children and refused to join others (irritability). He applied himself well in school, and kept occupied when alone (no daydreaming). His manners and conduct showed no outstanding peculiarity other than his desire to be alone (no bizarre behavior). He took part in the regular children's program so that observers were not impressed by any diminution in number of personal interests. His various pursuits were similar to those of other children of like development (no regression in nature of interests). When praised he blushed easily and seemed disconcerted. At the slightest critical comment regarding himself, he became violently angry and resentful (sensitivity to comment and criticism). In spite of frequent episodes of voluntary solitude he was a vigorous athlete and excelled in many strenuous games (no physical inactivity).

Psychiatric interviews were futile, insofar as establishing rapport with Nick was concerned, and his general adjustment in the hospital, punctuated here and there with truancy, remained unchanged. A diagnosis of schizoid personality was considered plausible.

Tabulation

By way of summary, and for purposes of comparison, the presence or absence of each behavior trait in the 14 children has been tabulated in Table 1. Granted that any graphic method of recording personality factors suffers from apparent over-simplification of complex material, the advantage of being able, in a systematic way, to match or contrast the various patients is obvious.

DISCUSSION

Theoretical Significance of Various Traits.   In attempting to understand the relative importance of the eight traits under discussion, the concept of primary and secondary symptoms in schizophrenia, as introduced originally by Bleuler,[9] and applied to children by Sukhareva,[10] is useful. According to this concept certain primary symptoms are directly related to the fundamental disturbance in the psychosis. When these primary symptoms are present, others arise secondary to them, as an expression of the way that the child, handicapped by his primary symptoms, adjusts to his surroundings.

Seclusiveness and irritability related thereto appear to be the most important traits in the present study. Not only are these the only two which were present in all 14 children (Table 1), but this particular combination was not encountered in any of the patients with other sorts of behavior disorders who were used as control material.

TABLE 1. TABULATION OF BEHAVIOR TRAITS PROMINENT IN 14 SCHIZOPHRENIC AND SCHIZOID CHILDREN (Patients 1 to 4, inclusive, were psychotic)

	Alice	Beatrice	Charles	Gwen	Dan	Ed	Frank	Harry	Ira	Jack	Karl	Len	Mary	Nick
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Seclusiveness	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Irritability	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Daydreaming	*	*	*	*	*	*	*	*	*	*	*			
Bizarre behavior	*	*	*	*	*	*	*	*	*	*	*			
Interests—Diminution	*	*	*	*	*	*	*	*	*	*	*			
Interests—Regressive		*	*	*	*		*	*	*					
Sensitivity	*			*	*	*		*			*	*	*	*
Physical inactivity	*			*	*	*	*	*	*	*			*	

Seclusiveness appears to be a primary and fundamental symptom. According to psychoanalytic teachings, the essential quality of a psychosis lies in the disordered relationship which exists between the patient and reality.[11] Seclusiveness directly expresses such a primary disturbance, since by the very act of being seclusive the child withdraws from many situations in real life.

Irritability, on the other hand, seems merely to measure the intensity of the seclusiveness. While patients of many sorts are seclusive, in only a few does the trait exist so dominantly that interruption arouses the sense of tension and discomfort which characterizes irritability.

Two other traits, when present, obviously depend upon the schizophrenic child's desire for seclusion. Diminution in number of personal interests and physical inactivity are practical corollaries of a situation wherein the child deliberately shuts himself off from the usual occupations of his companions. His personal interests are thereby restricted in number, as compared with those of his fellows whose range of pursuits is wider. In the same way, many outlets for the usual expenditure of a child's energy become automatically closed.

Daydreaming is the common resort of children whose surroundings fail to interest them, as evidenced in the schoolroom by pupils who do not grasp or enjoy the material presented. It is an open question, however, whether schizophrenic and schizoid children are so attracted to their fantasies and daydreams that they become seclusive or whether daydreaming is prominent because it is one of the few outlets for children who withdraw from normal social intercourse.

Bizarre behavior is merely that which is inappropriate and illogical in the surroundings where it occurs. It is apparently motivated from within the child. Possibly it represents a dramatization of his daydreams, or it may arise from deeper unconscious levels on a compulsive basis. Since the origin and meaning of much bizarre behavior are hard to determine, it is best tentatively considered as a primary symptom of childhood schizophrenia.

Potter[3] and others have pointed out that regression is psychodynamically characteristic of schizophrenia. Regression of personal interests as an expression of regressive emotional drives may be interpreted as another primary manifestation of the disorder.

The significance of sensitivity to comment and criticism is not clear. If, as Melanie Klein[12] suggests, the schizoid child withdraws from reality because it becomes unbearable to him, this sensitivity may predispose to seclusiveness. However, sensitive children with-

out other schizoid characteristics are often encountered, so that such an explanation fails to fit all cases.

In the light of the foregoing discussion, seclusiveness, bizarre behavior, regressive nature of personal interests, and sensitivity to comment and criticism may, for the time being, be considered as the most fundamental of the eight symptoms. Irritability, diminution in number of personal interests, and physical inactivity appear secondary to seclusiveness. The status of daydreaming is not clear.

Diagnostic importance of behavior traits. A diagnosis of schizophrenia in childhood should not be based entirely upon the patient's symptoms. Homburger,[1] Lutz,[4] and others have urged that details relative to the child's history and development are quite as important. The results of the present study should clarify diagnosis only to the extent of a more adequate understanding of symptoms. By pointing the way toward a systematic presentation of schizophrenic children's behavior, this material may result in more logical and lucid case reports and thus facilitate the comparison and evaluation of important factors in individual patients.

The difference between patients diagnosed as schizophrenic (psychotic) and those with schizoid personalities seems to be a matter of degree rather than kind. The data in Table 1 reveal that the presence or absence of various traits is of little assistance in differentiating the first four psychotic children from the remainder. However, a study of the case reports brings out the fact that the behavior employed as an expression of the individual traits was much more distorted in the psychotic children than in the others. There is a need for a specific enumeration of factors which distinguish the psychotic from the nonpsychotic patients of the schizophrenic reaction type, just as the present study presents material which should be of assistance in distinguishing schizophrenic and schizoid behavior from that of other types.

SUMMARY

Eight prominent behavior characteristics of schizophrenic and schizoid children have been enumerated as the result of prolonged observation of 14 such patients in a children's neuropsychiatric hospital. A working definition of the various characteristics is presented, and the significance of each is discussed. The results of

the study should clarify the diagnosis of childhood schizophrenia and furnish the basis for a more orderly and practical presentation of case material.

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ERRONEOUS RECOGNITION*

(*Fausse Reconnaissance*)

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A person's sense of reality normally fluctuates. The degree of its intensity is dependent upon the quantum of feeling or emotion with which perception is registered and upon the orderly functioning of the organ which registers perception. The registering organ is, presumably, some portion of the central nervous system.

Aside from the degree of its emotional investment, an extremely important factor in determining the force of the sense of reality is present time, because the past and the future are relatively unreal. Time, like reality, is primarily registered in the individual by the reflexes from physiological functionings, such as breathing, hunger and evacuation. Time also is dependent upon reality perception, and without reality time has little meaning.

The major disturbances in reality appreciation, which are depersonalization and derealization, are always accompanied by a sense of time distortion. Certain minor distortions in reality perception, and in the feeling of estrangement, have been grouped by French psychiatrists under the term *fausse reconnaissance,* here translated as erroneous recognition. This term includes situations in which a person has the feeling that he has seen a part or the whole of a certain setting before, *deja vu,* or that he has said something before. Occasionally he thinks he has heard or smelled something previously; or objects with which he knows he is familiar appear unfamiliar as if he were seeing them for the first time.

A rare variation of the "already" or "before" experiences is what may be called "doubled thinking," a torturing symptom which the writer encountered once in a woman suffering from a feeling of unreality. When the patient wished to relate some incident, the thought came to her that she had already told it before, that she was "doubling it." The symptom terrified her, because it seemed to corroborate her idea that she was becoming "insane." The "doubling of thought" was nearly always connected with unpleasant incidents. In its mechanism, it is reminiscent of co-con-

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scious thinking which in turn has many elements of depersonalization.

In the erroneous recognition category, *deja vu* is one of the most common time distortions and, as a normal phenomenon, is especially frequent in childhood and adolescence. It is inherent in the vacillations of ego integration, especially in the adaptation of the ego to ego ideals and super-ego strivings.

Many writers of fiction have given descriptions to us of the feeling of erroneous recognition and depersonalization. Preoccupation with this phenomenon is found throughout Hawthorne's works —an example of which is here quoted from the "Scarlet Letter." After an emotionally exciting scene in the woods with the wearer of the scarlet letter, "A," the guilty minister returns to the town. "As he drew nearer he took an impression of change from a series of familiar objects which presented themselves. It seemed not yesterday or even years since he had quitted them. There, indeed, was each former trace of the street, as he remembered it and all the peculiarities of the houses . . . Not the less, however, came this importunately obtrusive sense of change. His own church had so very strange, yet so familiar an aspect that Mr. Dimmesdale's mind vibrated between two ideas; either he had seen it only as a dream hitherto or that he was only dreaming about it now."

Deja vu as a pathological experience occurs in an unclouded sensorium. When it takes place, circumstances and situations appear not to be new, and the patient has a disconcerting feeling about them of previous acquaintance through some elusive and unidentifiable association which he cannot fix. It differs distinctively from situations where the person is in doubt or mistaken in making identifications. This latter type of reaction is encountered, not only normally, but also is striking where the clearness of perception is disturbed by alcohol (e. g., Korsakow's psychosis) or by trauma.

In *deja vu* the person recognizes an obscure similarity between the current situation and one of the past but makes no misidentification. He reacts to this paradoxical memory difficulty with a disagreeable and disquieting affect, because the experience does not give the impression of a new reality which a person normally expects from an initial contact. The symptom of erroneous recognition generally becomes invested with a disturbance of the sense of

reality which is the essence of the phenomenon. As will be brought out later, it is also associated with an unconscious conflict of purposive planning which took place in connection with and at the time of the original situation.

Freud[1] considered *deja vu* a "motive to awaken that fantasy (conscious and unconscious) which had formed itself time and again as a wish for an improvement of a certain situation," and he states that Grasset had previously, independently, advanced a similar explanation. Subsequently, different investigators have pointed out various mechanisms through which erroneous recognition and other closely allied disturbances of reality feeling especially depersonalization, are achieved. Among these, may be mentioned observation turned inward instead of outward (Schilder, Eidelberg and Bergler, and Oberndorf); identification of the living persons with inanimate objects, thereby acquiring the immunity from punishment which lifeless objects enjoy (Searl); flight from reality into the realm of thought (Fenichel); erotization of thinking and cross-identification with the intelligent parent (Oberndorf); the mechanism of projection (Feigenbaum). Some of these writers have hinted that erroneous recognition may be a defense reaction.

In the present writer's experience, the erroneous recognition phenomena are accompanied by an affect which is significantly disconcerting, decidedly unpleasant and sometimes ominously warning of some impending danger. The affect is analogous to that experienced by patients with feelings of unreality, but the disturbing reaction is less intense. In a case which the writer has followed over a period of 20 years, the symptom of *deja vu* appeared transiently at the age of 18 in a male patient suffering from an overstrong mother identification. At that time, it affected him only as being embarrassing and puzzling. Because of improvement sufficiently great to satisfy him, he discontinued treatment. At the age of 38, under the stress of adaptation in marriage to a positive, masculine woman, the feeling of unreality, and eventually of depersonalization, developed. To this latter feeling, the patient reacted with an agonizing terror instead of the previous mild confusion accompanying *deja vu*.

The absence of disturbing affects in patients in whom the feeling of "having seen before" seems merely a matter of bad memory, whether organically or functionally determined, indicates that an alert, defensive reaction arises only when it is necessary to deprive the current situation of the threatening qualities of the original with which it is unconsciously linked. When the circumstance has originally registered as an agreeable memory or fantasy, the erroneous recognition phenomenon does not occur. In this respect, the reaction to *deja vu* is analogous to that arising in instances of forgetting. When there is no conflict concerning the fact forgotten, forgetting does not disturb one. On the other hand, where the forgotten occurrence is ambivalently invested and affect-laden, the failure to recall it may give rise to annoyance and to doubt concerning the patient's ego integrity, and he may feel as one patient put it "momentarily wiped out."

To focus attention on the reality disturbance, as well as on the defense function, in both erroneous recognition and depersonalization, the writer would refer to a female patient, aged 32, studied over a period of two years. She suffered from a feeling of loss of identity, from *deja vu,* and at times from the opposite feeling of unfamiliarity with things known to be familiar. These reactions began at the age of seven or eight and depended upon an extremely difficult actual family situation—the separation of her parents. The distraught child very probably could not have survived the violent clashes and frictions which followed in the family had she become more positively integrated.

The patient's failure to integrate, however, had extended so far that even as an adult when reading she would frequently identify herself so closely with a character in the story that she could not be sure whether she were actually that character or herself. The depersonalization could go even further. She often thought that she was dead; or she thought that she did not know whether she were really dead and only thought that she was alive. At other times, she would not know whether she was talking or only thinking that she was talking.

For over 25 years, during periods which lasted three or four months, a feeling of depersonalization had been present daily for from two to six hours. The loss of identity would develop almost

instantaneously and then later, without any conscious effort on her part, she would "come back to herself." There had been remissions when she had no attacks for as long as nine months; and from the age of 12 to 14, the feeling of loss of identity had been practically absent.

When she was a child, the moaning of the wind was one of the causes which could induce a loss of identity. It initiated sadness and depression, which were followed by a feeling of depersonalization from which the patient, now 32, still suffered. She described a typical episode as follows: "Many times I think that I am not myself. By that I mean I am in a room, and I am not sure whether I am there or not. I have to ask my husband if I am there. His reply that it is I who is there does not always convince me. At other times, instead of a doubt of my identity, a symptom apparently of a directly opposite nature may appear—of going into a place where I had never been before, or meeting people I have not seen before, yet having everything seem familiar—very much so. It gives you an awful shock when you know you haven't."

While the feeling of having been in a place before (erroneous recognition) and the feeling of not knowing who she was (depersonalization) did exist separately they would sometimes be present together. In either case she would not, as a child, tell her mother but would merely say that she felt ill and wished to be by herself. After two years of suffering from the disorder, she finally confided in her mother. The latter comforted her by saying that she, too, experienced the same feeling. But the reassurance to the patient lay, not in the knowledge that her mother was acquainted with the disturbing reaction, but that her mother, who had been afflicted with the feeling, had retained her identity and had managed to survive. From that time on, she was less frightened than bewildered by the recurrence of the phenomenon. Subsequently, she might partially overcome the bewilderment by thinking that she was right in feeling that she had been in a strange place before.

She said that when she did not know who she was or where she was going, she would reassure herself by repeating, "This has happened before. Keep on going, and you will come out all right." Usually this reassuring of herself, as having been in the situation

before and still being alive, was sufficient to enable her to carry on in the present and be less apprehensive of the future.

Another patient presented an unusual association of the feeling of having lived a thing before, with the thought that, because of this the power of prognostication for the immediate future should be present. The symptom also showed an interesting effect upon reality perception when the patient became aware that the feeling of *deja vu* afforded him no such power of prediction.

The patient was a school teacher, aged 38, married, who came to treatment because of psychic impotence due to unconscious homosexuality. He suffered from a host of other symptoms, the most crippling of which was the indulgence for hours in elaborate fantasies of reforming the government, the building of ideal cities and communities and the inventing of new social systems. The patient's withdrawal from reality had progressed to the point where practically his only contacts with the world were in teaching his history classes and in his study of history which served to accentuate his contact with the past.

In addition to his profuse fantasy-life, he frequently had had actual experiences of the following nature: "My father, mother and I are in the kitchen, my father eating his evening meal, my mother serving him and tidying up the kitchen, and I standing listening to my father's talk—really only half listening but catering to his desire for an audience. Quite suddenly the words spoken take on a new significance—becoming sharper, clearer, more real and familiar. Then it seems to me that I have lived this scene before or dreamt it. I become sure that I have dreamt it and I have the feeling that I know what is coming next. My uncle enters the room. 'That is right—he should enter now.' Then the idea comes to me that my father will say this or my mother will do that—for instance, that my father will cough or my mother will drop a dish."

What the patient felt he could and did prophesy would not happen. The realization of his error—the fantasied previous experience going one way and the real occurrences another—would not, however, bring him back more sharply to reality. Instead, the error tended to make him more detached again, and a mild defensive derealization would ensue. The scene and the words spoken would again become dim, vague, uninteresting and unreal. What the pa-

tient had expected would not occur. He would try to reassure himself with the conviction that he had dreamt the entire situation previously. Obviously, if he had dreamt the entire thing, including his prophecy, then he had not erred in the prophecy, because the situation was one of fantasy and not of actuality.

As another defense of the correctness of his feeling of "already lived," there would come the idea that he had really dreamt only a fragment of the dream, and that if only he had dreamt longer or had finished the dream, there would surely have been the desired sequel. Thus, he vindicated his belief in his ability to foretell correctly the course of events in the situations he described in his "already lived" experiences.

After such an instance of erroneous recognition, the patient would come back into partial contact with actuality; but he would remain puzzled for some time and continue detached from the current situation. He had noticed that a feeling of erroneous recognition, coupled with the experience of lapsing into a state of detachment, followed most frequently the realization that a fantasied previous experience had failed to turn out as prophesied.

Let it be noted that his ascribing the source of prophecy in the "already lived" situations to dreams is significant. Freud and others have stated that the feeling of *deja vu* depended upon forgotten or repressed day dreams which concerned analogous subjects, while Ferenczi was able to trace these situations to experiences in recent or long forgotten night dreams. In some cases, the present writer thinks, it is a reactivation of circumstances which have actually been encountered but have been suppressed or repressed by the patient. In this sense the patient is right that he has seen it before.

This patient also experienced, like the female patient mentioned previously, the following form of reality doubt: Often, in returning to a scene or a situation in which he had been previously, he had the feeling that he was seeing for the first time objects with which he knew he was perfectly familiar.

In the course of discussions of these experiences the writer had told him that such phenomena were well known, and mentioned to him that they were called *deja vu* in psychiatric literature. The same night he had a dream which he recorded as follows:

"I am reading a letter addressed to me by C. P. O. It is a very long letter, sheaves of paper, reprimanding yet friendly and solicitous. I am pleased with the evident interest shown in me. The letter takes me to task for not having written down my experience of *deja dit* (already said). (Those are the words I see in the dream quite plainly in script—a copy book script.) I evidently assume *deja dit* to mean *deja vu* for I do not seem to question its meaning. The letter goes on to show me the importance of writing out my experience of *deja vu* which appeared in my dream as *deja dit*."

It is noteworthy that the patient had never studied French although he had gained a slight acquaintance with it during a bicycle tour in France some 10 years previously. The appearance of the words *"deja dit"* in the dream mystified him completely but he recognized it as meaning something which had already been said. The patient, who at one time had been sympathetic to the Communist movement, was in a state of strong positive transference. When he was questioned as to why he had thought the letter addressed to him had been signed by C. P. O. instead of Dr. O., he said that writing C. P. O. had been entirely unintentional and that C. P. O. represented the initial letters of an anti-Communist organization called "Communist Party Opposition"—to which group he must have sensed the writer belonged.

When he was asked to associate on *deja dit* the following associations came to his mind—just why he could not say:

When he had been a student at Morris High School, he had been a chronically tardy pupil. Finally, after many warnings, his section officer took him to the principal's office. They found the principal, not in his private office, but in an outer room which was crowded at the time. The officer presented him and told the story of his constant late comings. The principal, after a few questions, learned that he had transferred from Townsend Harris High School. "That explains it," he said. "Townsend Harris sends us all its trash." The patient, incensed, protested in an angry voice, "I am not trash and I was not sent here. I came of my own accord." Soon after that, he suppressed a desire to cry. Then, at the request of the principal, he explained the reasons which prompted him to leave Townsend Harris, even though the truth is

that he had never been able to make clear to himself why he did leave Townsend Harris for Morris High School.

The relevance of this apparently irrelevant episode to the *deja dit* of the dream is not remote. The patient was a shy, bashful person, and was extremely unkempt in his personal appearance—both characteristics dependent upon his neurosis. At times, the writer had called his attention to his slovenly habits (Communist Party Opposition)—psychologically the equivalent to him of the high school principal's comment made years before—that he was trash. Another element in the school situation which repeated itself during the analytic treatment was his tardiness in keeping appointments. The mystifying substitution in the dream of *deja dit* for *deja vu* may be regarded as the expression of a thought which had often occurred unconsciously in protest against the writer's comments (more remotely, against the prototype, the principal and father)—namely that he was not trash, and also that he resented the writer's comments, made in the course of the analysis, since he had come for treatment of his own accord.

The dream also indicates that his main concern is not with the *deja vu* phenomenon—in which the physician is interested—but with the consequences of taking his own part in the matter of opposing and remonstrating against the analytic interpretations—a difficult thing for so diffident a man. In the dream the *deja dit* acts, furthermore, as a reassurance to him. He indicates to himself that all this has been said before, yet he has been allowed to remain as he was at Morris High School. If similar threats come up again in the psychoanalytic situation, he need not fear them. Fundamentally, the erroneous recognition (*deja dit*) in his case acts also as a reassurance that his homosexual tendencies will not be harshly condemned in the analysis.

In this presentation, the writer has not taken into account certain similar states of estrangement occurring in the wake of organic injury to the nervous system recorded somewhat uncritically, it is felt, by Haug.[2] Nor is it possible to discuss here the suggestion of Mayer-Gross,[3] who has described so thoroughly the psychic and somatic changes in these states, that certain symptoms "point to something more than purely psychic connections." Mayer-Gross,

however, does point out that where there is a real lack of familiarity following organic memory impairment, depersonalization never occurs.

On the other hand, analytic investigations indicate that the initial situation to which the *deja vu* (*deja dit*) is vaguely but unconsciously linked had been associated with bygone results or affects which the patient feared. In this sense, *deja vu* is a phenomenon of reaching back into the past. Its regressive temporal aspects have been emphasized almost exclusively in the extremely limited literature on the topic. Although the memory is of the past, the writer wishes to point out that the motive of *deja vu* is an effort at protection, through reaffirmation against the reality of the present and the possibilities of the future.

Deja vu is primarily a disturbance of reality perception, and the reaction to it serves to reassure the patient against this insecurity, by divesting the recurrent circumstances of the impact of a new reality through an estrangement affect. It constitutes a defense reaction against future danger or unpleasantness, as well as against the anxiety associated with the memory of an undefined, unsolved experience which is originally responsible for the reaction (Freud's "wish for improvement of the situation").

In its economic aspects, it serves to reassure the individual that he is not venturing into an entirely new field, with which there is an unconscious association of uncertainty and failure because of its similarity to one in the past. He now appreciates that the situation is not too greatly fraught with danger in the immediate future, since he has been in it, heard it, smelled it before, and has survived. The symptom removes, to some degree, the patient's sense of insecurity, even though he is annoyed at the reaction as unusual and abnormal. In the original situation, a conflict had arisen concerning the rôle he should assume.[4]

Through the analysis of the elements entering into the conflict responsible for the development of erroneous recognition—an analysis which is undertaken only if the symptom is sufficiently potent and frequent to interfere with the patient's activities—it is possible to cause it to disappear. This is achieved by divesting the present

reality of its threat and by making reassurance, through delay and review of conflicting elements, unnecessary to the patient.

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THE FORCE CONCEPT IN CATATONIA*

BY GEORGE S. SPRAGUE, M. D.

Catatonic dementia præcox has, like other psychiatric conditions, been diagnosed at various times from standpoints of differing conceptions. The more dynamic viewpoints of the last decades have wrought a considerable amount of divergence in our ideas of the disease picture and its significance. Uncertainty has naturally arisen as to the details which are to be used as criteria for diagnosis; and this is the more true because our understandings concerning the significance of the illness have been so varied. In an effort to clarify the picture of catatonia as it is actually observed under the conditions of a fairly consistent diagnostic determination by a single psychiatric staff, the writer has made a study of 100 cases. Except for three omissions from the study, these formed an entirely unselected series of men, with consecutive "dementia præcox, catatonic type" diagnoses, admitted to the New York Hospital—Westchester Division during the past decade. The three omissions were of two patients who remained under study but a few days and one whose diagnosis remained in considerable doubt.

It is not intended to offer a statistical study. The clinical records and histories of these hundred catatonic individuals have been reviewed to determine what symptomatology is actually presented as a composite picture. Attention has been diverted from individual details, in order to seek some of the more basic phenomena which constitute a fundamental pattern for the catatonic reaction type. It was determined that certain kinds of phenomena were found with considerable regularity. While specific symptoms might not occur in precisely the same form in all cases, relationships could be recognized between given symptoms, so that when particular ones were absent others seemed to be present by substitution. First, it is in order to review briefly some of the symptoms found most frequently and, therefore, seeming to be characteristic for this group.

Abrupt variation was perhaps the most striking of all symptoms observed. This was shown at some time during his illness by al-

most every patient in the series. It was evidenced in a variety of ways: a sudden mutism, an abrupt muscular overactivity, an unpredictable impulsive assault. With a great many patients, the phenomenon was one of rapid change in the nature of conduct. With other patients, or with the former group at times, there were marked quantitative differences in the output of energy. There were spectacular differences between an individual patient's productions, with perhaps but a brief interval between. Thus a pleasant, soft-spoken man would have an episode of violent behavior or of shouting, only to have it subside as abruptly as it had begun. Another example of quantitative abruptness was the familiar picture of rapid onset of stupor or emergence from a stuporous state. Still another frequent example was the seizing upon some topic of thought or speech which would then be followed with tireless energy—for a period of minutes to months—only to be abandoned, perhaps as suddenly. One saw also variable presence and absence of the standard Kraepelinian phenomena of catalepsy. Without ostensible reasons, periods of resistiveness, of negativism, of emotionality, or of posturing would appear and disappear.

These symptoms in themselves are, of course, familiar as individual phenomena; but when they were grouped in such a series as this one, a certain factor became increasingly obvious. This already has been referred to in discussing the quantitative differences in the output of energy by many patients; and its appearance is further stressed by the very frequent abruptness, or episodic character, of a given symptom. One cannot but be impressed with the forcible, vigorous display which is thus made. Tentatively, such indications may be referred to as evidences of an energetic, forceful exhibition of strength, either in physical display or in psychic vigor.

If attention is turned now to some of the psychic contents of these patients, there is to be observed a very similar type of evidence. The catatonic patient concerns himself, with great frequency, with delusions involving forces, powers and influences. There are to be mentioned great numbers of delusional notions about the force of gravity, about telepathic influences, about irresistible influences from a distance, about the power exerted by the dead and similar notions. The ideas are not all so bizarre as these.

They may deal with such ordinary influences as the compulsive power of the laws of obedience to parents or the driving force of one's perfectionistic ideals. Although in these multiform ideas the most varied specific content can be found, it is almost invariably the case that each patient has at least a core of a certain attitude. He is concerning himself with some force, about which he thinks— and he thinks of it specifically as a force. This is time and again demonstrated by the actual words in which a patient makes it clear that he is interested in the compulsive power implied in his thought content as much as he is in the mere ideas of that thought content. In its extreme form, this attitude of mind leads to the production of the interesting "omnipotence of thought" conception. Thus, one patient feared to read of a house having burned, because he felt that if the idea were brought into his mind, his mental activity would actually cause the house to have burned. Such an example characteristically illustrates a tendency, by no means limited to catatonia, in which excessive power is ascribed to the thinking process. We may note that here again, as in the other instances listed, there is essentially a quantitative difficulty or component.

Another of the types of catatonic reaction deals with patterns of muscular behavior. The symptoms referred to here are such familiar phenomena as stereotyped behavior, repetitive actions, echolalia, echopraxia, catalepsy, and cerea flexibilitas. In all of these separately named symptoms, there reposes a common factor which is believed to be of considerable theoretical significance. Each symptom places more emphasis upon a pattern of muscular activity than upon self-assertion by the individual in terms of ideas as expressed in speech. It may be stated that such a tendency is a definite evidence of regression. Many patients have indicated, when they later became more verbally accessible, that they actually had been using physical behavior as a substitute for, or as symbolic of, certain thoughts or ideas. Indeed this symbolic, often ritualistic, conduct display is so very frequently found as to suggest that it must be of prime significance in the catatonic process. At some stages, practically every catatonic patient produces elaborate gesturing activity, ranging from prolonged pantomimes to simple stereotyped reiterations such as alternating the nodding and shaking of the head.

Not infrequently, these muscular expressions go even a step further in betraying their employment as substitute expressions for what might otherwise be stated in ideational content or verbal utterance. Action patterns are very often observable which show ambivalence, as when a patient starts to walk forward, blocks, walks backward and seems unable to resolve the conflict. The occurrence of episodes of rigidity, in which antagonistic muscles are simultaneously innervated, is a related phenomenon which expresses conflict in bodily terms instead of in the more usual verbal form.

In the same individual at different times—as well as in contrasting one patient with another—a varying proportion was found in the total energy output, between the use of words, ideas, and language on the one hand and nonverbal muscular innervations on the other hand. While some patients expressed themselves fluently, with adequate conversation, and used muscular bodily conduct in a way closely approximating the usual, others could be arranged in a series using less and less adequate language production and depending correspondingly more and more upon the use of non-language muscular innervations, progressively approaching the completely stuporous reactions. Here we have indications of a progressive ascendancy of muscular dominance in self-expression over the use of the customary adult employment of ideational dominance.

Some of the details of symptomatology already referred to in this paper represented the grosser physical manifestations, which served to determine the Kraepelinian diagnostic entity of catatonia some decades ago. The case histories studied revealed such phenomena in by far the greater majority of instances; but, as might be expected with modern refinements of differential diagnosis, some of the patients in this group were diagnosed without having developed these grosser symptoms. In these cases, it became important to scrutinize the evidences which lay within the psychic realm, even before the more crudely obvious phenomena had developed. A state of bewilderment, from the slightest to the most marked degree, appeared to be generally characteristic. Some patients were too perplexed to carry on coherent conversations or to express themselves adequately, while others merely voiced differ-

ent degrees of uncertainty as to a correct evaluation of their own situations. This dissolution within the individual's estimate of his own integrated self was revealed in many ways; but all of these ways could readily be reduced to the same disquieting or perplexing conception of personal impairment, to notions of changes, discrepancies, contradictions or disintegrations in the balance of personality factors.

Destruction of one's own human synthesis seemed to some confusing, to others disheartening, to still others vexing, inconsequential or infuriating. Some complained that their minds were being weakened or were taken away; others, that foreign thoughts were forced upon them, that they were made to think or to act in ways over which they had no control, that they were made homosexual or were influenced in incestuous fashion by their parents. They felt that their impulsive outbursts, abrupt assaults, or mute episodes were the results of forces from without—of drugs, hypnotism, telepathic control, or mystic influences. Their unaccepted erotic tendencies were recognized as persecutions likely to come from those about them, or vaguely from afar.

This weakening of the personality integration was expressed by many quite definitely: "I am decomposing into a mere chemical composition;" "I am rotting away;" "I cannot even tell how I feel;" "My deterioration and dementia are progressing;" "My thoughts wander." They complained of not being able to think or to make decisions. But in addition to these negative aspects of the picture, a large number of the group showed dissatisfaction with their capacities and sensed something lacking in themselves. One reproached himself for not having higher standards for use of his energy; several men thought they must give birth to children. To reassure himself that he was not "crazy," one man kept writing his name, restoring his confidence by this familiar sight of his usual self. Requests to be prevented from making unsocial or perverse outbursts were common. The impressions of personal inadequacy or of something unacceptable within oneself were very often described in terms of having cancer, syphilis, bursting abscesses in the brain, infections and contaminations. It was striking how almost invariably the psychosis concerned itself immediately with

considerations of, or conduct reactions to, the idea of a disturbance of a comfortable, acceptable balance within the personality.

Sex played a very large rôle in the clinical pictures, both in talk and in behavior. Preoccupations with unresolved attitudes about homosexuality and autoeroticism, speculation as to one's own sexual makeup, whether male, female or hermaphroditic—these were found in large numbers. The notion was widespread that sex was a dangerous force; and, associated with this belief, numerous ideas revolved, such as conceptions of duty, compulsions, moral obligations or abandonment, persecution, strange or mystic influence, infection and contamination.

These observations give a background for another trend which seemed to be fairly characteristic of the group, that of concern with ideas about cause and effect, about laws of relationship, about making correct allocations to the right categories. Many patients became so fascinated by these concentrations upon concepts of order, of sequence, of psychologic force and logical power as to deal almost exclusively with them for periods of from a few minutes to many months at a time. One man worked unceasingly at a scheme for combining the use of typewriter, shorthand, "Speedwriting" and Latin so as to create a super-effective method of abbreviation for recording written matter. But, characteristically, he ignored all practical relationships and was entirely engrossed in the abstract problem of reducing things to a powerful, orderly process of classification. Another man spent weeks in thousands of efforts to create the best form of his own monogram. That this preoccupation, in an art form, was fundamentally dealing with the problems of management of power and flow, seemed to be borne out when he rather abruptly abandoned monograms to begin a similarly tireless consideration of mechanics. He, then, for weeks at a time, drew cogs, pivoted levers, compression cylinders, and other engineering devices for the use and control of forces.

If now, there is an evaluation of the clinical material presented by the 100 patients, it will be historically correct to consider first the motor phenomena, for it was these which led Kahlbaum and Kraepelin to their original formulations of catatonic dementia præcox. All of these, the negativism and resistiveness, the states of tension and cerea, the repetitive patterns, the stupor states and abrupt

outbursts of energy, can be classified as disturbances of the usual energy output in the muscular field. Many occur at a level so regressive as to evidence little convincing connection with ideational contents. With this part of the clinical material, it is, therefore, necessary to conclude that muscular activity has, at least to a considerable degree, superseded the usual dominance of the individual's thought content. The abnormalities of distribution and flow of physical energies illustrate quantitative disturbances—with their abrupt changes, their inhibitions and their erratic controls of various customary functions. In such cases then, the process may be described as one in which problems of physical activities and bodily strength have, to an important degree, assumed priority over the intellectual activities usually characteristic of adults.

Among such patients, the formulation may be suggested that a regression has taken place, resulting in the individual's partial or complete neglect of ordinary thought content in order to be occupied instead with some of the physiological phenomena which once were of chief importance to him. When he was first learning by experimentation with voice, arms and legs that he had certain capacities of movement, of control, and of inhibition, there were two results of great importance. In the first place, he was learning something about the fact of his own entity, his limitations and his capacities of self-expression. And in the second place, he was beginning to build a conception of power and force, as important, pleasurable and effective attributes of his muscular apparatus. Out of such beginnings, significance arises in proportion as muscular activities are found to lead to various results. Here can be seen a level of normal human development to which the catatonic with Kraepelinian muscular symptomatology has reverted.

But, since many of the cases in this series did not regress so far, the writer has attempted to determine the principles underlying their illnesses, which might be called the "non-Kraepelinian catatonias," and to discover a formulation which would properly apply to them. If the chief types of ideational material which have been described as characteristic for the group are summarized, it is possible to list the following typical mental contents, which were found in great profusion:

1. Concern over instinct pressures; influence and power of sexuality.

2. Pressures pro and con about disruption of the personality.

3. Ideas of the power and influence of infections, contaminations, filth, cancer.

4. Bewilderment and perplexity over impairment of intellectual facility.

5. Preoccupation with forces of law, ethics, morality, ideals, obedience.

6. Concern with notions of electricity, telepathy, vague influences, strange forces.

7. Fixation upon ideas of cause and effect, order, classification, collation.

8. Impressions of omnipotence of thought, the force of compelling ideas.

It was possible to elicit certain common factors in all but one of these various evidences of illness. If an exception is made for the symptom of bewilderment, which seems to represent a reaction to the other tendencies described, all these evidences of illness have an essence of some kind of compulsion. There is a certain "must" or "should" about them all. The connotation of forcefulness, of vigor, of pressure, runs throughout. In some instances, the power concept is represented as a factor in the person himself—as instincts or urges, or as physiological or pathological reactions following Nature's principles—notions of upheavals in personality structure and balance. In others, there is concern about nonpersonal forces, as represented in an ideational fashion by the strength of logic, the immutable weight of causality, law and implication. In more diffused indefinite form, are the vague notions of thought-power, of nameless force, or strength of some uncomprehended kind.

It was a striking fact that in this part of the case series, the points of chief concern were not so much the ideas themselves as the pressures, strengths, compulsions or other indications of force and power. This was often explicitly stated by the patients themselves. We are therefore confronted with the same type of reac-

tion in the cases with ideational problems as was exhibited chiefly in the muscular field by the other members of this series. Whether in the nonlanguage, purely somatic realm, or in the domain of thought and ideas, power seemed to be the chief focal interest. In some cases, associated contents were quite obliterated, while in others, related thought was still evidenced in varying proportions. But the central core was always present.

Conclusion

The writer proposes therefore the following envisagement of the catatonic process:

When an individual develops some notion of a force or power whose nature is not well understood, yet with which he senses some disruption of his personality integration, a considerable regression may occur leading to a partial or complete preoccupation with forces and powers as such. This is catatonia, which, focusing upon power apart from its ordinary practical associative connections, may be evidenced in varying mixtures of muscular and ideational symptomatology.

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A STUDY OF SERUM PROTEINS IN MENTAL DISEASE

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Despite the widespread use of shock therapy in the treatment of dementia præcox and other psychotic conditions, few biochemical studies of its effects have been carried out. It was the primary purpose of the present investigation to study the serum proteins during insulin and metrazol shock with a fractional precipitation procedure, in which a continuous composite graph of the solubility-precipitation behavior (pattern) of the various proteins is obtained by precipitating with gradually increasing amounts of suitable salts, at constant pH.[1] With this procedure, Perlzweig, Kondritzer, and Bruch[2] obtained a more complete picture of the relationships among the serum proteins—and of deviations from normal in pathological conditions—than with the conventional methods for the determination of albumin and globulin by precipitation with arbitrary concentrations of neutral salt.

The fractional precipitation procedure was applied to sera obtained from psychotic patients immediately before and after metrazol convulsions and during insulin coma. No significant effect of the treatments was observed. However, a comparison of the findings obtained in schizophrenia with data obtained in the same manner in healthy persons revealed a small but significant difference.

Report of Experiment

Protein Fractionation Procedure. In the procedure employed, 0.5 cc. portions of freshly centrifuged serum were added dropwise to 15 cc. portions of salt solutions in test tubes with gentle whirling. The solutions all contained KH_2PO_4 and K_2HPO_4 in the same molar ratio (1:1) (pH 6.5 to 6.8), but the total concentration of phosphate ranged from 1.2 to 3.0 mols in 0.1 mol increments. The proteins were allowed to precipitate over night at room temperature and were filtered through fine paper under strictly uniform conditions. Total nitrogen was determined on aliquots of the filtrates by the micro Kjeldahl method and, after subtraction of the N.P.N determined on a trichloracetic acid filtrate of the original serum, the percentage of the total protein remaining in solution at each molality of phosphate was calculated.

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TABLE 1. CASE HISTORIES

Case No.	Age	Sex	Clinical diagnosis	Duration of illness	Previous treatment	Clinical status at time of test
1. E. K.*	32	M.	D. P.	At least 2 yrs.	Insulin, 1938 Metrazol	Slight improvement, generally good physically
2. R. S.†	21	M.	D. P. Mix.	6 weeks	Insulin, 37 shocks	At thirty-eighth insulin shock, showing steady improvement
3. E. G.†	28	M.	D. P. Heb.	4 yrs.	Insulin, 47 shocks	At forty-eighth insulin shock, clinical status fair
4. E. J.*	33	M.	D. P. Par.	3 yrs.	Metrazol	Improved at sixth injection
5. H. J.*	30	M.	D. P. Heb.	13 mos.	Insulin Metrazol Benzedrine	Unimproved at second metrazol seizure
6. S. H.†	34	F.	D. P. Cat.	3 yrs.	Insulin Metrazol	Unimproved after 144 comas
7. M. S.	24	F.	D. P. Mix.	6 mos.	(Control)	Unimproved
8. C. S.†	30	F.	D. P.	2 mos.	Insulin	At forty-third shock, slightly improved
9. F. J.†	33	F.	D. P. Par.	1½ yrs.	Insulin Metrazol	Unimproved
10. H. S.	31	F.	D. P. Par.	4 yrs.	Insulin	Cooperative, slightly improved, subsequent relapse
11. E. W.*	27	F.	D. P. Heb.	1½ mos.	Insulin Metrazol	Some improvement after tenth convulsion
12. L. S.*	20	M.	Psycho. Obs. Com.	3 yrs.	Metrazol	Unimproved after eleventh convulsion
13. L. W.*	18	F.	Psycho. Obs. Com.	5 yrs.	Metrazol	Unimproved after three treatments
14. A. K.†	31	F.	D. P. Heb.	18 days	Insulin	Slight improvement after 37 treatments
15. H. S.†	31	F.	D. P. Heb.	1 yr.	Insulin	No improvement

*Patients studied before and after metrazol shock. †Patients studied during insulin coma.

Selection of Patients for Study. The diagnosis and pertinent information concerning each of the patients studied are summarized in Table 1. It should be emphasized that the subjects were selected only after ruling out all those having any pathological condition known to affect the serum proteins.

Investigations in Metrazol Shock. The fractional precipitation procedure was applied to samples of serum taken from six patients immediately before and after the production of a convulsion by metrazol. The values obtained before convulsion were averaged for each salt concentration and compared with the corresponding values obtained after convulsion. There was no significant difference; and it may be concluded that the metrazol convulsion had no effect on the protein precipitation pattern. However, an increase in the concentration of total serum protein followed the convulsion in every case, probably because of some dehydration of the serum. The average increase was 0.6 per cent (from 8.0 to 8.6 per cent).

Investigations in Insulin Coma. Similar studies were carried out in seven patients with dementia præcox during insulin coma. These patients had been receiving insulin therapy for some time before this study was carried out; and it seemed best, therefore, to compare the findings with determinations in six untreated schizophrenic patients. No significant differences were observed.

Comparison of Serum Protein Patterns in Schizophrenia and in Health. In the foregoing studies, the protein patterns were determined in 17 samples of serum from 13 schizophrenic patients. Some of these samples were obtained during metrazol shock or in insulin coma but, since these procedures had no significant effect, it is permissible to group them with samples obtained in untreated patients for comparison with determinations carried out in six healthy subjects. Although the solubility-precipitation patterns of these two groups were almost identical, there was a slight but consistent difference between them: From 1.26 M to 1.65 M phosphate, proportionately less protein appeared to have been precipitated from the sera of the mental patients than from those of the healthy controls. The difference represented an average of only 2.5 per cent of the total protein, but the consistency of the findings suggested that it might be significant. Hence, the data were subjected to a rigorous statistical examination,* using the method of

*Dr. Joseph Zubin advised the writers in the statistical analyses.

Fisher[3] for small samples in the modification of Snedecor.[4] His F value expresses the ratio of the larger to the smaller of the following two variances (here variance is taken as the sums of the squares of the deviation from the means) : intragroup variance and intergroup variance. For a comparison of averages obtained on series of 13 experimental and six control subjects respectively, the critical values of F, those which could arise by chance not more than 1 to 5 times in 100, lie between 8.4 and 4.45, respectively. Those values of F which were found to be significant have been placed above the respective phosphate concentrations on Chart I.

DISCUSSION

Several investigators[5-11] have studied the effect of insulin on the total protein concentration and colloid osmotic pressure of the blood serum in rabbits and dogs—with conflicting results. Increases, decreases, and absence of change were reported. Similar studies in man have been consistent in showing an increase in serum protein concentration following insulin administration in diabetes,[12] schizophrenia,[10, 11] and liver disease.[13] In the present study a direct comparison before and after insulin administration was not made, but after metrazol there appeared to be a definite increase in the total protein concentration of the serum.

Three investigators have studied the effect of insulin on the protein fractions of serum. Taubenhaus[12] found a marked rise in globulin following insulin in normal humans. As the albumin fraction was little affected, the A/G ratio decreased; and the total protein concentration increased. Zozoya[14] reported a shift in the proportions among the albumin, pseudo-globulin, and euglobulin fractions of the serum in schizophrenic patients following insulin administration. On the contrary Butt and Keys,[11] whose publication appeared while the present study was in progress, found no change in the A/G ratio following the administration of insulin to schizophrenic patients. The findings here are in accord with those of Butt and Keys; no effect of insulin on the distribution of protein fractions in the serum could be demonstrated, even with a more sensitive method. So far as the writers are aware, there have been no previous investigations of serum proteins following metrazol.
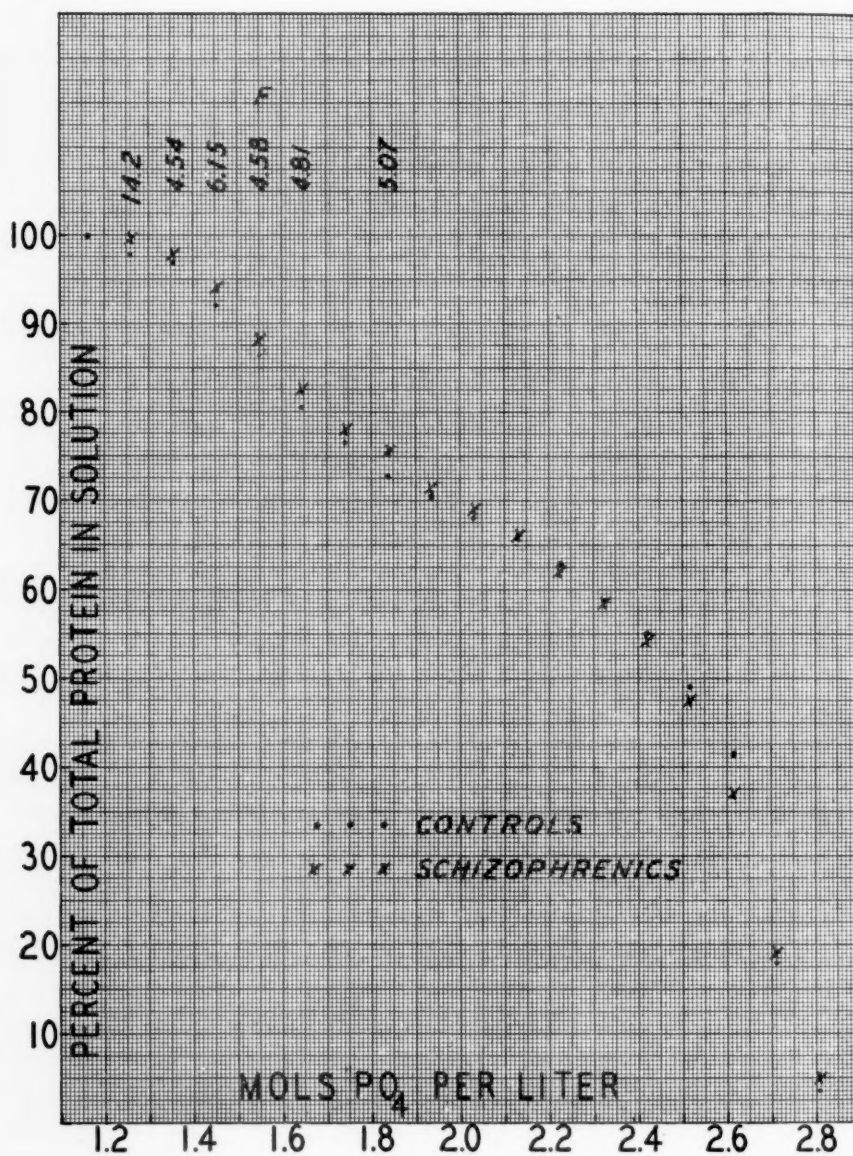
CHART 1

Few studies of the serum proteins in relation to untreated mental disease have been reported. Gerundo[15] observed several physico-chemical changes in the blood serum and plasma in schizophrenia including an increase in the surface tension of serum, a change of the electrical charge of globulins, or the absence of electropositive globulins. The isoelectric points of the blood serum were found by Tomioka[16] to be abnormal in 17 male schizophrenics, an indication that some change in the blood proteins had occurred; but the results were too irregular to permit definite conclusions. Kondritzer[17] found a significant difference between phenylpyruvic oligophrenic patients and controls in the serum protein precipitation patterns. On the basis of an extensive physico-chemical study of blood sera[18] and on immunological studies, Ludlum and Zozoya[19] classified mental disease into four types, each of which had a characteristic distribution of the various protein fractions. In none of these was the euglobulin fraction decreased.

The findings indicated that the proportion of euglobulin in the serum proteins of the schizophrenic patients studied was lower than in healthy subjects. Despite the significance of this difference as shown by rigorous statistical analysis, we do not feel justified in drawing any general conclusions in view of the small series of subjects studied. This observation which was incidental to the main problem under investigation is presented in the hope that it may stimulate further study of serum proteins in schizophrenia.

Summary

No effect of metrazol shock or insulin coma on the precipitation pattern[2] of the serum proteins could be demonstrated.

Metrazol shock therapy produced an increase in the concentration of total protein in the serum.

A small but significant difference between the serum protein precipitation patterns in schizophrenia and in health was observed. The finding indicated that the proportion of euglobulin in the serum proteins of the schizophrenic patients was less than in the serum proteins of the healthy subjects studied.

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SEQUELAE IN POSTTRAUMATIC PSYCHOSES

A Study of Sixty-seven Cases with Encephalograms in Ten

BY HAROLD L. VYNER, M. D., AND HOWARD SWIRE, M. D.

Numerous articles have been written on the mental reactions produced by trauma, but by far the greater proportion relate to the neurotic type of reaction. Fewer have been written on the frank psychoses, undoubtedly because the actual number of frank psychotic reactions is small. This is pointed out by Harrington,[1] who says that of 5,429 cases admitted to a state hospital, only 17 were diagnosed "psychosis due to head injury." Bonner and Taylor[2] note that over a period of 16 years, one half of 1 per cent of the first admissions were of the posttraumatic variety.

These psychoses were first classified adequately by Adolf Meyer,[3] who divided them into the following main types: (a) direct posttraumatic deliria, (b) posttraumatic constitution, (c) traumatic defect condition, (d) psychoses in which trauma is merely a contributory factor, (e) traumatic psychoses with injuries not directly affecting the head. A recent simplified classification approved by the American Psychiatric Association[4] designates the following types: (a) traumatic delirium, (b) posttraumatic personality disorders, (c) posttraumatic mental deterioration, (d) other types, to be specified. Thus, it omits disorders in which trauma is merely a contributory factor and those psychoses from injuries not affecting the brain.

This paper is concerned with the study of the sequelae of 67 cases of posttraumatic psychoses of a resident population of 8,796 patients at the Pilgrim State Hospital. When one considers the small proportion of this type of psychosis in so large a representative group, it is possible to realize the relative rarity of this type of mental reaction.

There were 63 males and four females in this series of patients.

Divided into types, 15 of these individuals were initially diagnosed as cases of traumatic delirium, 27 as cases of posttraumatic personality disorders, and 25 as cases of posttraumatic mental deterioration. Of the 15 cases of traumatic delirium, four improved sufficiently to be paroled; the rest show signs of mental deterioration and are still in the hospital.

A considerable number yielded findings indicating localized involvement of the central nervous system: 26 patients have neurological signs at the present time, 18 have convulsive seizures, and eight have both. Five of the remaining patients had a history of convulsions following their accidents which had subsequently disappeared and have not reappeared during their stay in the hospital. At the present time 31 patients show only the mental pictures as a residual of their head injuries.

Of the entire group, 10 cases were submitted to encephalographic examination. Permission for encephalography was obtainable in only this number. Six of these 10 show clinical signs of involvement of the central nervous system while the rest, although there were undoubtedly brain injuries, still do not show signs of neural involvement except for the mental picture, even though they have been under observation for from 13 months to 34 years. Four of this group continue to have convulsive seizures as their most prominent clinical symptom; two have both neurological signs and convulsive seizures; and four show neither neurological signs nor convulsive seizures.

Osnato[5] stated that the typical case of psychosis due to head injury is one in which the following sequence of events occurs; severe craniocerebral injury followed by a period of unconsciousness or delirium, later recovery with grave defect symptoms, marked behavioristic changes, giddiness, vertigo, sullenness, irritability, increased susceptibility to alcohol, and a psychosis which usually becomes progressively worse. In general all the cases in this series conform to this description. However, a number of them were complicated by the fact that they had occurred in individuals who were markedly alcoholic, arteriosclerotic, or who had previously shown psychopathic personality traits in their character structures.

The predisposing factor of alcohol in a traumatic psychosis is discussed by Schilder.[6] This is brought out in the present series by the fact that 39 of the cases were alcoholic. That alcoholism is a determinant is evident when one realizes that the alcoholic often exposes himself to the traumatic situation. Again, the fact that the individual is an alcoholic indicates a probable deficiency in his personality makeup; and thirdly, it is known that marked alcoholic indulgence causes cortical and subcortical brain damage,

rendering that brain more susceptible to the development of a psychosis following head injury. Of the 67 patients, 30 were excessive users of alcohol, and nine indulged moderately before their accidents.

Another complicating factor was cerebral arteriosclerosis. This was present in 20 of the elderly patients at the time of injury.

In 22 patients, personality development seemed to be abnormal prior to injury. One could not be certain of this in all patients, as the description of their characters in the records was too meager. However, one obtains the impression that in at least 18 patients there was a preponderance of seclusiveness, unfriendliness and shyness, indicating a definite schizoid character. In four, the personality description appeared to be that of a psychopathic type. It would seem apparent then that at least a third of these individuals had marked character deviations prior to the trauma. That their personality deviations became aggravated by their injuries is probable, especially when one remembers the observation of Foster Kennedy that fairly well adjusted individual groups who are exposed to repeated head injuries only rarely develop traumatic neuroses or psychoses. This is especially true among hockey and polo players in whom severe head injuries are common, and who still continue at their former level of satisfactory adjustment.

These three factors, alcohol, arteriosclerosis, and abnormal prepsychotic personalities, often render the diagnosis of posttraumatic psychoses difficult. However, this diagnosis was arrived at in each of these cases by various observers, and oftentimes in various hospitals. In all these cases it appeared that the head injury was the principal factor, certainly at least precipitating the psychotic state.

In this series there were 36 patients who had fractures of the skull of a varying degree. That the presence of a skull fracture in itself, with its accompanying subdural or subarachnoid hemorrhage, has little relationship to the severity of the mental reaction or of the ultimate prognosis of the patient, has been brought out by Wechsler.[7] Of the seven patients who recovered or showed marked improvement and were subsequently paroled, five had a history of skull fracture. Of the group remaining in the hospital, those who have a history of skull fracture have not shown any greater degree of severity in their mental reactions than those without skull fractures.

Although the presence of a skull fracture seems to have little relation to the type of mental picture which follows, it does seem to have some bearing on whether convulsive phenomena follow. In 38 patients with skull fracture, 14 subsequently experienced convulsions, and when one remembers that only 18 of the entire 67 had convulsions, it is evident that those patients who showed fractures of the skull are more prone to develop convulsive phenomena. Even in the four in which convulsions occurred without diagnosable evidence of skull fracture, it is possible that fractures may have been present.

A total of 31 had a known history of "unconsciousness." In 15, the duration was unknown. In the remaining 16, unconsciousness varied from a few minutes to nine days (six were unconscious for more than one day). Of the seven who were paroled, six were rendered unconscious by their accidents; in one the unconscious state lasted for a week. This patient was considered recovered at the time of his parole. Of the remaining parole cases, two were recovered, one much improved, and three improved. The length of hospital residence in the parole cases varied from two to 14 months. Of the remaining 60 patients still in the hospital, there seems to be no prognostic significance inherent in the absence or presence of unconsciousness, or in the duration of unconsciousness when present, since all these patients are either unimproved or deteriorated after hospitalization ranging from one to 40 years.

It was thought advisable to have encephalographic studies in some of these patients who have been showing mental symptoms from 13 months to 34 years, to determine if in cases of this prolonged duration there was continued progressive brain damage. In this group, because of either advanced age or physical debility, unusual difficulties were encountered. Ages varied from 51 to 63. Encephalograms were taken under morphine and atropine without general anesthesia. In several individuals, after injecting 35 or 40 cc. of air, marked pallor developed accompanied by clammy perspiration, slow thready pulse, and falling blood pressure. In four, although spinal fluid was obtained, no air was visualized in the ventricles even though as much as 85 to 100 cc. of air were injected. This may indicate arachnoid adhesions, although this phenomenon occurs also without adequate explanation in normal brains. How-

ever, a failure of visualization to occur in four out of 10 cases is an unusually high percentage. Three of these four were repeated on other occasions and yet air was not visible in the ventricles. Of the remaining six, from 30 to 90 cc. of air were injected and the following results were reported by Dr. Dyke of the Neurological Institute. Of the 10, one was reported to be normal. In two, there was evidence of internal hydrocephalus, but it was questionable whether this was due to atrophy or to cerebral hypoplasia. One could not be interpreted; and the remaining six showed evidence of moderate generalized cerebral atrophy. In the cases showing generalized cerebral atrophy, there seemed to be little difference in the extent of the atrophy in the comparatively recent cases and those of relatively long duration. This would seem to indicate that the organic brain damage is not progressive, but reaches a certain intensity, perhaps within one or two years after the injury, and then remains stationary. In one case of only one year's duration there was as much progression of the atrophy as in other cases of much longer duration.

One picture is here presented from each of three encephalographic studies. These are typical of the entire group. Varying periods of time have elapsed since the accidents, but they all show a moderate degree of cerebral atrophy. Brief résumés of the case histories follow:

Case 1: J. L., age 65 years; diagnosis—psychosis due to trauma, traumatic delirium. Date of accident, February 18, 1939. He was found on the street bleeding from the lower lip; he was said to be intoxicated and had fallen on his face. At Bellevue Hospital he appeared acutely ill. A clot was present in both nostrils and in the patient's mouth. The odor of alcohol was on his breath. The pupils were small and reacted to light. Bilateral Babinski and Gordon signs were present. The spinal fluid was grossly bloody; subsequent taps were clear. X-ray of the skull was negative. The neurological examination was negative at the time of his discharge from Bellevue Hospital. He was admitted to the Pilgrim State Hospital on March 6, 1939. Mental examination showed him as retarded, confused, disoriented and with scattered defects of both recent and remote memory. His comprehension was poor and contradictory statements were made. At times he was circumstantial and expressed many irrelevant details. His insight and judgment were impaired. This patient was excessively addicted to alcohol. At the present time, his mental status is essentially the

same as just described. He remains confused, disoriented and circumstantial with a lack of insight and judgment. He is pleasant, friendly and cooperative. There are no neurological signs at present.

The encephalograms showed the lateral and third ventricles to be definitely dilated. The aqueduct and the fourth ventricle are not visualized and there is no gas in the cerebral sulci. The impression is one of moderate cerebral atrophy. Eighty-two cc. of air were injected. (Figure 1.)

Case 2: T. S., age, 59 years: diagnosis—traumatic psychosis, posttraumatic mental deterioration. Date of accident, 1933. The patient was struck over the head with a blackjack. It was stated that he was unconscious for two hours following the accident, after which he awoke in the hospital where he remained for five days. Since that time he has been suffering from dizzy spells and lapses of memory. He was admitted to Bellevue Hospital in 1935 at which time he was euphoric, restless, simple and childish. He was subject to convulsive seizures. He was then committed to the Manhattan State Hospital and later transferred to the Pilgrim State Hospital. At the present time he is confused, childish, untidy, indifferent and apathetic. His conversation is rambling. His manner is effeminate. There are occasional attacks of fainting and dizziness. There have been no convulsions during hospitalization. Prepsychotically, the patient was friendly, timid, with little sexual drive. No history of alcohol.

The encephalograms show the lateral and third ventricles to be somewhat enlarged. The left ventricle extends upward and laterally more than the right. It is impossible to visualize the aqueduct and fourth ventricle. The cerebral sulci appear normal. There is some gas in the subdural space over the cerebral hemispheres. The impression is one of bilateral cerebral atrophy more marked on the left. Seventy cc. of air were injected. (Figure 2.)

Case 3: J. D., age 52 years: diagnosis—traumatic psychosis, posttraumatic constitution. Date of accident, 1906. The patient was injured while riding as a jockey in a horse race. He was unconscious for seven days. A considerable portion of the frontal bone was removed. Since the time of the accident the patient has suffered from epileptic convulsions of increasing severity and frequency; he has had as many as five in one night. There is usually an aura and a slight feeling of dizziness. As a result, he could not hold a steady position. He became quick-tempered, over-religious and often quarrelled with his wife. He was noted to be hallucinated; at one time the patient thought that he was to be killed. He was admitted to Bellevue Hospital in January, 1928, where he responded very slowly in a fragmentary manner. He was confused, fearful, apprehensive, and at times mute. Hallucinations were present as well as a shallow emotional tone.
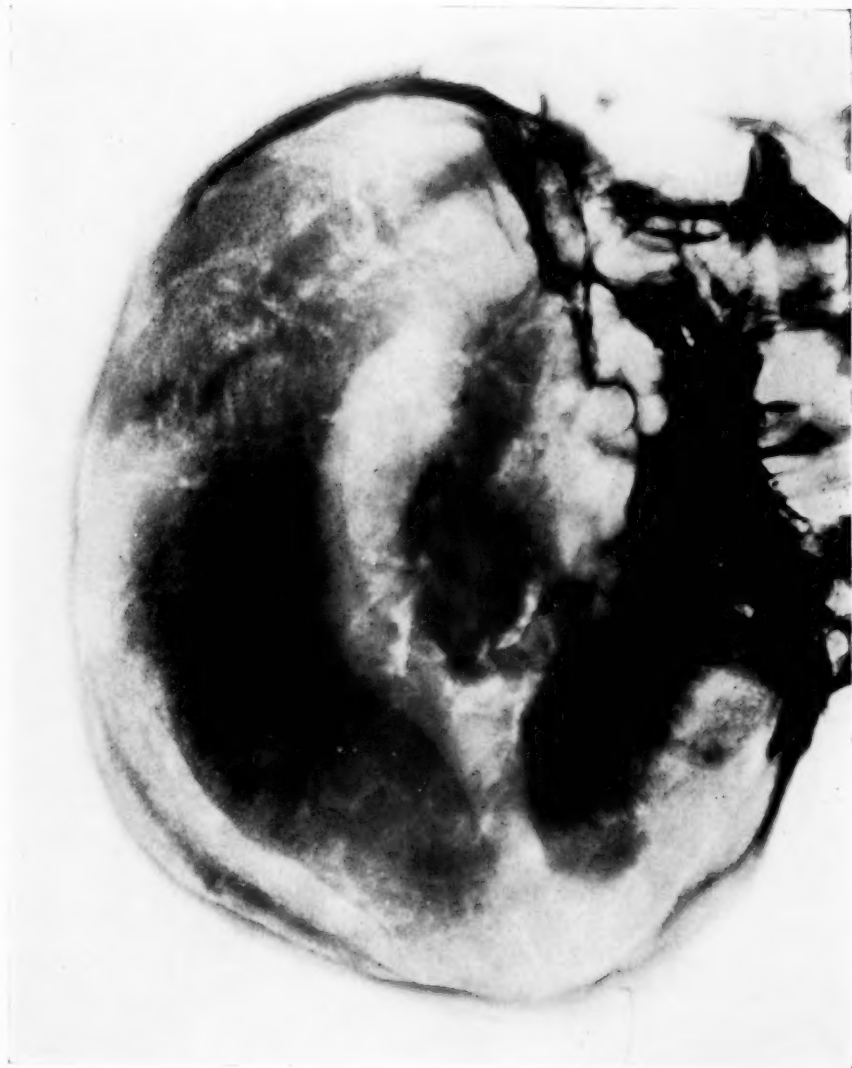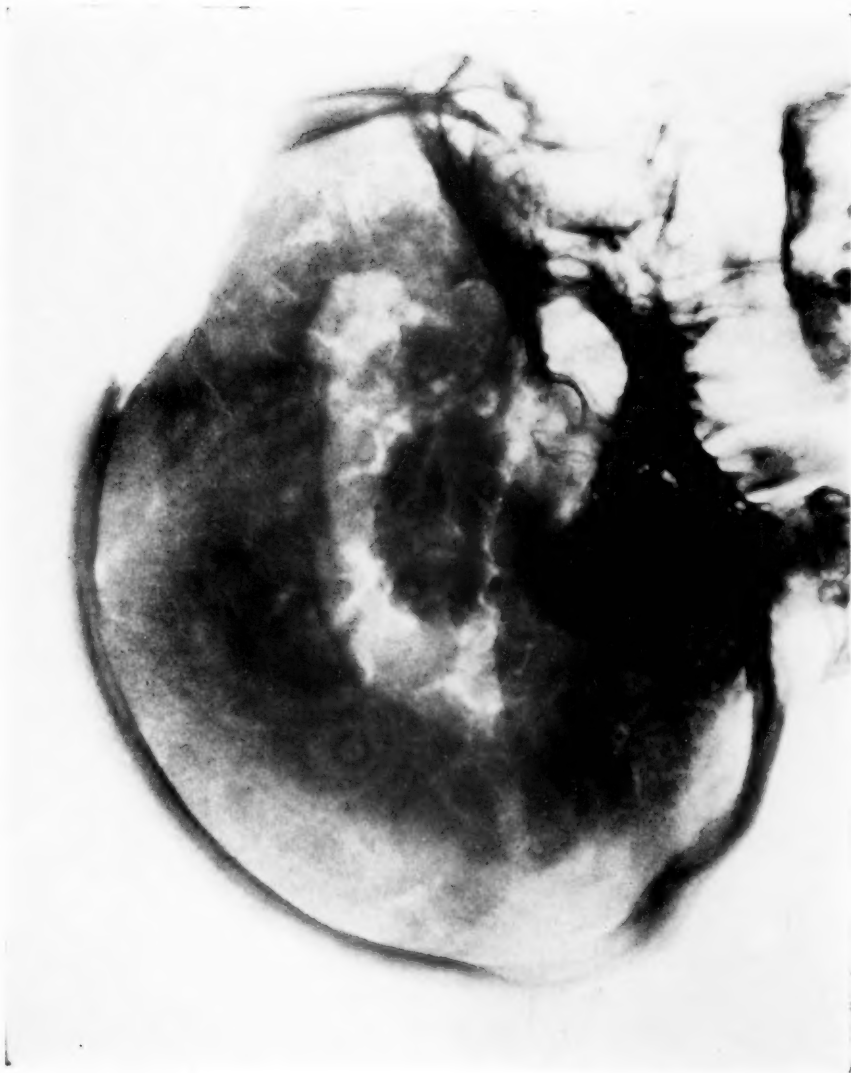
Figure 1

Figure 2

Figure 3

The patient was admitted to the Central Islip State Hospital on January 31, 1928, where his condition was essentially the same. He was transferred to the Pilgrim State Hospital on May 9, 1933. He has undergone a slow and gradual deterioration in all spheres, so that at present he is emotionally dull, has difficulty in thinking and shows gross defects of the sensorium. He continues to experience convulsions and to show neurological signs. These are as follows: the pupils react sluggishly over a short excursion; the knee jerks are considerably hyperactive.

The encephalograms show the lateral ventricles to be within normal limits in size, but there appears to be some out-pouching of the right frontal horn. The atria of both lateral ventricles appear to be rather large. The cerebral sulci are within normal limits of size. There is a large osseous defect in the vertical portion of the frontal bone. The impression is one of cerebral atrophy. (Figure 3).

CONCLUSIONS

As a result of this study, the following conclusions were reached:

1. The percentage of traumatic psychoses is significantly small in the population of the average mental hospital.

2. Excessive alcoholism, cerebral arteriosclerosis, and abnormal prepsychotic personalities are important predisposing factors in the development of the posttraumatic psychoses.

3. Those patients having skull fractures associated with their injuries are more prone to develop convulsions.

4. The cerebral atrophy following brain injury does not appear to be progressive, but apparently reaches its height within one or two years following the injury.

5. The presence of, or duration of, unconsciousness following the head injury is not related to the severity of the mental reaction.

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CURARIZATION WITH QUININE METHOCHLORIDE TO PREVENT TRAUMATIC COMPLICATIONS OF METRAZOL SHOCK THERAPY

BY A. E. BENNETT, M. D., AND PAUL T. CASH, M. D.

In previous communications,[1,2] one of the writers reported pioneer work with convulsive shock therapy in affective disorders. From the beginning, he has realized the hazards of this therapy and has attempted by various means to eliminate them.[3] Finally, after original research, it was demonstrated[4] that an aqueous extract of crude curare could be standardized and given safely prior to metrazol shock. The proper amount of curare given intravenously produces flaccid motor paresis (artificial myasthenia gravis) sufficient to soften markedly the convulsion of metrazol. It adequately prevents all traumatic complications. More recently, before the American Psychiatric Association,[5] May, 1940, detailed experience with the method was reported. Uniformly successful experiences have also been reported to the writers, by many other investigators in curare-metrazol therapy.

The collection and preparation of curare, however, is a difficult task, requiring expeditions by expert explorers into the South American jungles to procure adequate amounts of the potent, highly toxic drug. The writers have, therefore, endeavored to find a drug with a curare-like action that would safely replace crude curare. Many drugs have a curare-like action: quinine, erythroidin hydrochloride, quaternary ammonium bases in general, muscarin, snake venom, methyl strychnine and the products of muscular metabolism.

The writers have been interested in comparing the effects of some of these drugs with those of curare. Burman[6] has reported on the similar action of curare and erythroidin. Rosen, Cameron and Ziegler[7] have recently employed the latter drug with success in the prevention of traumatic complications in convulsive shock therapy. The writers have had experience with erythroidin but have been more particularly interested in the possible substitution of quinine or some derivative of quinine in this therapy. Before using curare, they tried quinine sulfate ineffectually. Quinine has been known for some time to have a curariform action,

as shown by its relaxing effect upon myotonia congenita and dystonia musculorum deformans. It also aggravates the symptoms of myasthenia gravis. The commercially available quinine salts, however, have too weak a curare-like action to be useful in convulsive shock therapy.

King[8] has shown that in curare there are certain tertiary ammonium bases. It has been known that quaternary compounds formed by the addition of the alkyl radical to the nitrogen atom of the quinoline ring have a curare-like action. King[8] prepared a synthetic compound called quinine methochloride, formed by the addition of a methyl group to the quinuclidine nucleus of the quinine molecule. Harvey[8] has shown that this drug has a strong curare-like action when administered either orally or parenterally.

The drug is relatively insoluble in hot aqueous solution, 20 mg. per cc., and the writers prepared their solution at that strength. Dr. A. R. McIntyre has compared the reaction in animals of quinine methochloride given intravenously with that of curare. Instead of a pure curare effect, as reported by Harvey, he found a curare-like action. (See Figures I and II.) The effect in the dog, as compared with that of curare, is a rather marked drop in blood pressure with diminished respiration before complete cessation of nerve muscle contraction occurs; whereas the pure curare effect shows complete curarization of muscle, or blocking of nerve muscle impulses, without any demonstrable drop in blood pressure or marked change in respiration. However, a definite transient paresis of muscles is produced, very similar to the action of curare; and in the human patient, this is clinically indistinguishable from curarization. This flaccid paresis of muscles is sufficient to protect the patient from fractures in metrazol convulsions.

The writers were at first considerably concerned about the possible margin of safety, particularly whether dangerous central or side effects from quinine might occur. Furthermore, it was noted that in the animal, the curare-like action came on more rapidly than with curare and passed off more swiftly. The writers have demonstrated, however, that prostigmin is a rapid antidote for quinine methochloride toxic symptoms and that artificial respiration will counteract any bad effects.

Figure I. Shows a typical curare block of neuromuscular transmission with no changes in blood pressure.
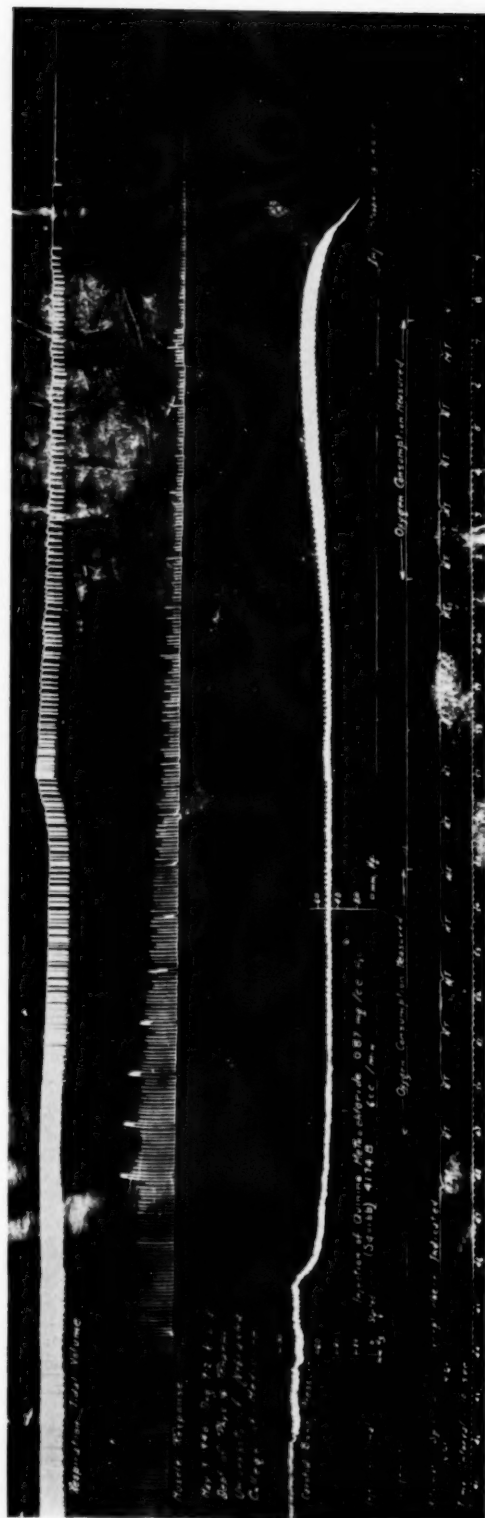
Figure II. Shows motor paralysis from quinine methochloride with incomplete block of neuromuscular transmission while respiration and blood pressure are markedly depressed.

Clinically, the writers have carried out considerable experimentation with both oral and parenteral administration of the drug. In spastic paralysis they are able to obtain a complete curariform action after intravenous injection of 10 to 15 mg. per kilogram of body weight. This curare effect wears off in from 10 to 15 minutes and can be completely counteracted by an intravenous injection of 1 to 2 cc. of prostigmin. Curarization by oral administration was found more difficult, requiring about four times the intravenous dosage. Prior to convulsive shock therapy, a complete relaxation of body musculature is obtained in all patients with intravenous injections of from 8 to 10 mg. per kilogram of weight, an effect clinically very similar to that of curare. This curare-like effect, dependent upon the amount of drug used, markedly reduces the severity of the convulsive seizures from metrazol.

Early in the use of combined methoquinine-metrazol convulsive shock therapy, it was noted in a number of instances that the period of apnea was prolonged, suggesting more respiratory embarrassment than with curare. Artificial respiration and prostigmin were necessary to restore normal breathing. The writers also were able to confirm the laboratory observation that there was a decided drop in blood pressure, which they had not seen with curare unless it was injected too rapidly. However, by the time the metrazol shock had passed, the blood pressure was back to original or higher levels. The writers have since learned that the dosage was too high in the cases where there was respiratory embarrassment. With smaller dosage, they have seen no marked development of this symptom.

To satisfy themelves as to the margin of safety with the two drugs, the writers have compared intravenous injections of quinine methochloride with the use of curare preceding metrazol convulsive shock therapy. Table 1 illustrates the dosage of quinine methochloride used for various weights of patients.

In 300 quinine methochloride-metrazol treatments, the writers have had only one accident, and that a very questionable one. A 63-year-old patient had received over 50 metrazol shocks at various periods during the past two years on account of recurrent episodes of depression. The first courses were with metrazol alone. Later

he had courses of curare-metrazol. After quinine injection, curarization was effected with 10 mg. per kilogram and metrazol shock was given. Shortly after the convulsant seizure, the patient became cyanotic and died of a typical cardiac failure. Since no necropsy was performed, death may have been the result of treatment or of a preexisting coronary disease. Because of this accident, quinine methochloride therapy has since been confined to younger patients.

TABLE 1. QUININE METHOCHLORIDE SCALE

Amounts in cubic centimeters of standard solution, 20 mg. per cc., to produce dosages equivalent to 8, 9 and 10 mg. per kilogram of body weight

| Body weight | | Dosage | | |
lbs.	kg.	8 mg. level	9 mg. level	10 mg. level
100	45.4	18	20	23
105	47.6	19	21	24
110	49.9	20	22	25
115	52.2	21	23	26
120	54.4	22	24.5	27
125	56.7	23	25.5	28
130	58.9	24	26.5	29.5
135	61.2	24.5	27.5	31
140	63.5	25	28.5	32
145	65.8	26	30	33
150	68.0	27	31	34
155	70.3	28	32	35
160	72.6	29	33	36
165	74.8	30	34	37
170	77.1	31	35	38.5
175	79.4	32	36	40
180	81.6	33	37	41
185	83.9	33.5	38	42
190	86.2	34	39	43
195	88.5	35	40	44
200	90.7	36	41	45

The writers have also given quinine methochloride mixed with metrazol, using about 2 cc. more metrazol than required for a convulsive dose and giving the combined injection in about one minute's time. By the end of the injection, a soft convulsion occurs. The quinine produces curarization rapidly enough to protect against a severe seizure. This combined single injection method

offers obvious advantages over the double injection technic. Patients seem to have less fear of metrazol therapy with this method.

CONCLUSION

A synthetic compound of quinine with a curare-like action, known as quinine methochloride, has proved to be a satisfactory substitute for aqueous extract of curare in the prevention of traumatic complications in convulsive shock therapy.

The dosage of this drug is slightly more accurate and easier to gauge in the patient. It has the drawback of being relatively insoluble, requiring a larger volume for intravenous injection. It produces a higher degree of respiratory complications; but these can be readily overcome with the antidote of prostigmin and the use of artificial respiration. The question of possible cardiac embarrassment from the drug is not entirely settled.

From present experience, the writers believe the drug is safe if carefully administered, especially if one has had previous experience with curare in this therapy and thoroughly understands its action. A combined metrazol quinine methochloride single injection technic has been developed.

Further experimentation with oral administration of the drug is necessary before it can be recommended in that form for relief of spastic rigidity states or for use in convulsive shock therapy. This drug offers great possibilities in the treatment of neuropsychiatric disease.

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A PLEA FOR THE STANDARDIZATION OF RECORDS OF THE PHARMA-COLOGICAL SHOCK TREATMENT OF THE PSYCHOSES IN NEW YORK STATE HOSPITALS*

BY W. B. CLINE, JR., M. D.

The pharmacological shock treatment of the psychoses is now well along in the fourth year of its use in the New York State hospitals, and the writer believes that the time has arrived when we can with profit conduct a critical review of at least one aspect of the total situation, that is, the manner of keeping records of the treatment. This would seem one of the most important factors in the whole problem of the shock treatment, yet it has been long neglected. It is in just such a treatment method as this, one which is new, little understood, and still the subject of much controversy, that the keeping of uniform and adequate records assumes the greatest importance. Without uniform and adequate records of a large number of cases, research is seriously hampered; and it is upon research that eventual solution of the many problems posed by the shock treatment must depend.

Before undertaking to review the status of record-keeping in the several State hospitals, the writer was aware of differences of opinion on certain matters relating to the shock therapy, but was hardly prepared to learn that there is virtually no general agreement upon any point—not even with respect to the value of the treatment itself. It was asserted that in some of the hospitals the shock treatment has proved to be far superior to any other method yet devised; while in other hospitals, it has been discarded as dangerous and as virtually valueless. Some of the physicians who have administered the treatment consider the results excellent on the whole and little short of miraculous in many cases;[1, 2] while others believe that the only benefits to the patients are gains in weight and moderately improved general health, both of which can be achieved through the administration of small doses of insulin before meals.[3, 4, 5]

Obviously, one group or the other is grossly in error. Either a great many of our patients are being subjected to unnecessary dangers and discomforts, or a great many others are being needlessly

deprived of beneficial therapy; and neither of these conditions should be allowed to prevail a minute longer than is necessary. Nevertheless, such widely varied opinion and practice in an otherwise fairly well standardized State hospital system is perhaps not so surprising as it might seem at first glance, when the relative novelty of the shock treatment and the enormously complicated problems posed by it are considered; but certainly every effort should be made to reach agreement, at least where fundamentals are concerned, at the earliest possible moment.

It would seem that a general stock-taking with a view to determining just what the facts are is clearly desirable at this time. Yet, however plainly apparent the need for such stock-taking may be, the fact is that under present circumstances such a study would be extremely difficult, if not impossible. This is chiefly because there has been no uniform plan of recording treatments during the past three years. Each treatment group has devised its own record system without, so far as can be noted, any collaboration whatever among the several groups. The result is that the records of no single hospital are directly comparable with those of any other, excepting only in respect to the very meager data reported on cards to the Department of Mental Hygiene at the end of each course of treatment.

Failure to develop a standard recording method would be of little importance if the treatment itself were standardized, which it certainly is not. The technique of treatment is quite as widely varied as is the manner of recording it, although most of those who administer it believe they are adhering generally to the method of Sakel as he originally outlined it. The truth seems to be that each group has made minor changes from time to time, with the result that wide divergences have developed, although each group still maintains the general form of Sakel's original method. In a few instances, there have been major departures from the original plan. The result of all this has been the evolution of radically different techniques of treatment with, naturally, different therapeutic results.

But the writer would not decry the lack of standardization of the treatment. On the contrary, these very differences give a point of

attack upon the whole problem which should yield much information, provided an adequate standard recording plan be adopted. It would then be possible to know just what technique was employed in each instance, and to evaluate clinical results in the light of technical procedure.

Some hypothetical but typical potential benefits of such a standard recording might be cited. Suppose it were learned that "X" State Hospital's shock treatment consists of 10 or 20 shocks, during which a period of (hypoglycemic) coma lasting one or two hours is considered adequate, and that the results of the treatment have not justified its continuance. Then it is learned that "Y" State Hospital reports much better results and that the treatment there consists of 50 or more shocks, where the goal is the medullary stage of the insulin effect. Finally, it is learned that "Z" State Hospital uses much the same methods as does "Y" but, in selected cases, uses the metrazol seizure as an adjunct to the insulin shock and is able to report still better results. Under these circumstances, would it not be permissible to conclude that technical differences are of great importance? Not only might such inferences be made but their validity probably could be proved—given an adequate system of records and a large number of cases.

There are many other factors, of which the operation could be traced in a large amount of carefully recorded material, factors of obviously great importance which are totally neglected in our present statistical compilations. For instance, personality factors certainly are of great prognostic significance; and the circumstances surrounding the onset of illness surely have some bearing upon outcome. Thus the matter of choice of patients for treatment should be included in any study of the results of treatment. It is true that such intangibles as personality factors do not easily lend themselves to statistical treatment; but it is also true that they are far too important to be ignored.

Another good reason for urging the adoption of uniform recording is that it would favor the development of a common language for discussion and description of the shock therapy. Strangely enough, this does not yet exist. In this situation as elsewhere, it is trite but true to say that there can be little meeting of minds where a common language cannot be found.

The writer's firm belief in the value of adequate and uniform recording derives from experience over a period of one and one-half years with such a method: That which was originally proposed by von Angyal[6] and Frostig[7, 8, 9] and modified by the staff of the Harlem Valley State Hospital in collaboration with Frostig. A similar method was later proposed by Goldman.[10] The records are graphic rather than descriptive and are based upon observation of the neurological signs of the insulin effect, which are taken as approximate indicators of the depth of shock. In this way a detailed and easily legible story of each day's treatment is provided. This becomes a permanent part of the patient's case history, where it is available for study at any time.

While this method is surely not devoid of shortcomings, it would seem far superior to any other which has been presented, and it is the writer's feeling that any system adopted for common use should be based upon the same general principles.

In addition to the records described, an attempt was made to indicate roughly the relationship of personality and etiological factors to the outcome of treatment; and, as expected, there was less success here. But even here there was considerable promise for future investigations. A paper dealing with the interrelationship of these factors is now in preparation.

It is true that an elaborate system of recording and reporting requires more of the physician's time and effort than does a less detailed one, but the advantages easily outweigh all other considerations. Certainly we should make every effort to solve at least a few of the problems which this treatment presents. Even if the shock method eventually fails to be accepted as a therapy of the psychoses, it still has great value as a research instrument, if only we are able to learn enough to use it as one.

Summary

The adoption of a uniform system of recording and an amplified plan of reporting the pharmacological shock treatment of the psychoses is strongly urged. It is contended that both clinical and research values would be greatly enhanced thereby, and that such a step would constitute a major advance toward endowing the shock

treatment, at long last, with some semblance of scientific respectability.

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THE TREATMENT OF AGITATED AND DEPRESSED MENTAL STATES WITH BENZEDRINE SULFATE AND SODIUM AMYTAL

BY RUPERT A. CHITTICK, M. D., AND ABRAHAM MYERSON, M. D.

The use of combinations of barbiturates with benzedrine (amphetamine) sulfate in depressed mental states at first glance seems illogical. The rationale for such a combination has been recently reported by the originator[1] of the idea.

To quote: "While the opposing effects of the barbiturates and amphetamine sulfate are quite clear cut, they may, nevertheless, be used to produce very worthwhile and reciprocal pharmacologic clinical effects. . . . When the barbiturate or sedative effect is desirable, the narcotic and toxic effect can be lessened or completely antagonized by the judicious use of small doses of amphetamine sulfate. On the other hand, when the amphetamine effect is desirable and the excessive reaction in the direction of disturbed sleep and hyperexcitability makes its proper clinical use difficult or impossible, the adjusted use of small doses of the barbiturates is of great value."

METHOD

To demonstrate more clearly the possible value of such a combination of chemicals, it was decided to give them to selected patients who were both agitated and depressed. From the studies already reported,[2] we know that one cannot predict with any accuracy what the effect of amphetamine will be on the depressed mood. One would expect, however, that the tense, agitated patient would become more agitated. One might, however, be able to affect the mood in a favorable direction with benzedrine and at the same time relieve the agitation with sodium amytal.

Agitated and depressed patients, who had shown no clinical change over a period of several months, were selected at the McLean Hospital, Waverley, Mass. The only contraindications considered were evidences of circulatory disease. A moderate increase in blood pressure did not exclude the patient, but small doses of benzedrine sulfate were given at first to be certain a dangerous elevation was not caused.

Each patient was continued on the regular daily program which had been in force for some time. When a patient was selected for the study, a note was made of the mental condition at the time, with a summary of the condition during recent weeks.

Usually, treatment was started with a dose of 10 milligrams of benzedrine sulfate and three grains of sodium amytal at 7 o'clock each morning. On the basis of the individual reaction to this dosage, indicated variations were made. For example, one patient was put to sleep by this amount of sodium amytal, so the dose was reduced to one grain. Another patient was quite comfortable during the morning but reverted to the premedication state about noon, so the dose was repeated. It will be seen that the essential emphasis in this research is on sodium amytal. The benzedrine sulfate was given largely to offset the narcotic effect and to maintain a more normal alertness.

Several patients received the medications separately for a week each and then received the combination, in order to rule out the possibility that the effect was coming from one drug alone. From time to time the medications were omitted, to determine whether the patient's behavior was being influenced by the treatment.

Case 1.

The patient was a 48-year-old widow who was admitted to the hospital October 31, 1938, after a year of depression. In the hospital, her symptoms had remained fairly constant. She was extremely agitated, depressed, seemed hopeless about the future and sought constant reassurance from the physicians and nurses. On the morning of February 16, 1939, she received 10 milligrams of benzedrine sulfate and three grains of sodium amytal. She remained in bed all morning, seemed quite drowsy, and, at intervals, complained of feeling extremely weak. On arousing, she became anxious to know what reaction was expected from the medication. As she continued to be very sleepy, following the morning's medication, the dose of sodium amytal was reduced on February 23 to two grains. After two days under this dosage, she remarked spontaneously that she felt much more hopeful. Her general agitation was decreased, and her activity program correspondingly increased. However, she worried for fear the change was entirely due to the medications and felt that she was being "doped." Because of this, the medication was omitted for one day, as a result of which, she felt much more agitated and tense. She asked to have it returned, said that

she got a definite lift from it, but that the agitation seemed to return toward midafternoon.   On June 1, the medication was repeated in the afternoon.   She seemed to be more comfortable and began to take trips out of the hospital. By the middle of July, she was going to the city alone. She was still having some difficulty, however, in making decisions. By September 1, the patient had improved to the point where it was difficult to see any mental abnormalities. On September 13, the afternoon dose was discontinued. She missed this for a short time, then did not speak of it again. On September 19, all medication was discontinued. This time she did not seem to miss it at all. She maintained her improved state, and on September 26 was discharged from the hospital as recovered.

Diagnosis: Manic-depressive, depressed. To this patient, the medication gave a very considerable comfort, though it is impossible to say that it shortened her hospitalization to any degree.

Case 2.

The patient was a 64-year-old widow who was admitted to the hospital May 28, 1939, on transfer from another hospital, where she had been in residence since January of the previous year. The patient had had repeated depressions, dating from 1902. The reports from the previous hospital indicated that she had been ill for about a year and had shown very little change during the past year. She had remained at a constant level since coming to this hospital. She was depressed, cried easily, felt hopeless about the future, and asked for frequent reassurance that she was going to get well.

On August 26, she received five milligrams of benzedrine sulfate, morning and noon. This only served to increase her tension and gave her no comfort whatever. It was, therefore, discontinued after four days. On October 29, she received 10 milligrams of benzedrine sulfate and three grains of sodium amytal. Under the effect of this, she said that she felt entirely well and immediately began plans for leaving the hospital. It was noticed, however, that she seemed drowsy following the medication, so the sodium amytal dosage was reduced to one grain. This gave the desired effect. She maintained her improvement and was discharged from the hospital on November 11, 1939. She continued to take the medication at home and was able to withstand several emotional traumata, one of which was the suicide of her son.

Diagnosis: Manic-depressive, depressed. In this case, there was a definite time correlation between her improvement and the giving of the medication. It is felt that the combination of chemicals was largely responsible for the patient's recovery; and cut short her need for hospitalization.

Case 3.

The patient was a 64-year-old married woman, who was admitted to the hospital June 1, 1934, having been ill since the summer of 1932. Her illness was characterized by agitation, depression and somatic delusions in reaction to which she asserted she could not breathe. At times, she made suicidal attempts, mostly of a dramatic nature but some of them of serious proportions. Her symptoms varied within a limited scope. At times she was less agitated than at others; but she was unable to maintain any phase for more than two or three days at a time. Throughout it all, the major symptoms were constantly present.

On May 19, 1939, she received 10 milligrams of benzedrine sulfate; and the dose was repeated on three successive days. During this time, she was fairly quiet during the daytime but extremely agitated and noisy at night. The next four days she received three grains of sodium amytal each morning. She was more agitated during those days, but she did become quiet late in the afternoons and slept better at night. By May 31, she was receiving benzedrine sulfate, 10 mg., and sodium amytal, 3 gr., each morning. She was somewhat uncooperative about taking the medication. She seemed more agitated for a time each morning, but was quiet toward midafternoon. She slept better at night. Her general agitation and depression seemed to alternate daily; that is, one day she would be extremely agitated, the next day quiet. The treatment was continued for about two weeks, during which time the patient showed no definite changes for the better or worse.

Diagnosis: Manic-depressive, depressed.

Case 4.

The patient was a 49-year-old woman who was admitted to the hospital September 14, 1939. She had had two previous depressions, the first beginning in November, 1933, and lasting until the following January, a second in December, 1934, which again cleared up the middle of the following January. Later she had had several repetitions of mild depression, but she had not required hospitalization.

The present attack began about six weeks before admission and was characterized by apprehensiveness, loss of interest, insomnia and indecision. She had been taking nembutal at night for several weeks to obtain sleep. On September 21, she received five milligrams of benzedrine, morning and noon. This was continued until October 2, with no apparent benefit. Commencing, November 5, sodium amytal, 1 gr., was given each morning with the benzedrine. This combination seemed to make her more comfortable, and she volunteered that she felt more relaxed and capable. There was no

dramatic change in her condition, however. She gradually improved and was discharged from the hospital on February 8, 1940, in a much improved condition.

Diagnosis: Manic-depressive, depressed. In this case the patient undoubtedly received considerable comfort from the medication, and her depression was less difficult for her to bear. There is no evidence, however, that it shortened the period of hospitalization. The patient has a rather complicated home situation and has continued to need psychiatric help from time to time since leaving the hospital.

Case 5.

The patient, a 51-year-old widow, had been admitted to the hospital July 16, 1938, after she had become increasingly indecisive, agitated, irritable and depressed following the suicide of her husband in August of 1936. Her behavior in the hospital has been quite constant. The patient had delusions that she was responsible for the death or disgrace of her family. She believes she never can get well and should be put out of the way. On February 10, 1939, treatment was started of sodium amytal, 1 gr., and benzedrine sulfate, 10 mg., each morning. She seemed to be much more calm and more cooperative after receiving the medication. The effect seemed to wear off toward noontime, however, so the dose of sodium amytal was increased to three grains. With this, she seemed much more relaxed, was able to sit quietly and read the paper, and to attend the various occupational departments. By April 20, she was again agitated, so the dose of sodium amytal was repeated, 2 gr., at 2 p. m. She seemed to be fairly comfortable under this dosage and continued to do quite well until October, 1939, when it was necessary to operate on her breast because of a suspected malignancy. The sodium amytal and benzedrine treatment was interrupted for a time. The patient was extremely upset by the surgical procedure; and when it had been entirely completed, the sodium amytal and benzedrine were tried again, but without any benefit.

Diagnosis: Manic-depressive, depressed and agitated type. This patient received definite comfort from the combination of sodium amytal and benzedrine over a period of several months. There was no evidence, however, that her delusions were influenced to any degree.

RESULTS

The case summaries indicate the general trend of the group. Of the total 21 patients (see table, page 367) five showed marked benefits; and it was the opinion that the hospital stay of one was defi-

nitely shortened. Ten other patients were at least more comfortable; and some of them who had not been able to participate in the regular activities previously were able to do so while under this treatment. It was observed, however, that while these 10 patients seemed more comfortable, they showed all of the improvement during the first two weeks and did not progress after that. When the treatment was discontinued after from four to nine months, they were somewhat more agitated for three or four days, but then returned to the status reached while receiving the medication. Three patients in whom schizophrenic features were prominent were not benefited to any apparent degree. In fact, one of them appeared more troubled than usual.

REPORT OF 21 AGITATED AND DEPRESSED PATIENTS TREATED WITH BENZEDRINE SULFATE AND SODIUM AMYTAL

Patient	Sex	Age	Diagnosis	Duration of illness		Results
1	F.	48	M. D.-Depressed	1½	years	Much improved
2	F.	64	M. D.-Depressed	1½	years	Recovered
3	F.	64	M. D.-Depressed	7	years	No change
4	F.	49	M. D.-Depressed	2	months	Much improved
5	F.	51	M. D.-Depressed	3	years	No change
6	M.	65	Involutional Mel.	7	years	No change
7	M.	59	M. D.-Depressed	2	years	Slight improvement
8	M.	80	M. D.-Depressed	1	year	Slight improvement
9	F.	63	Involutional Mel.	2	years	Slight improvement
10	F.	42	D. P.-Catatonic	13	years	No change
11	F.	59	M. D.-Depressed*	3	weeks	Much improved
12	F.	53	M. D.-Depressed	2	months	Slight improvement
13	F.	42	D. P.-Mixed	3	years	No change
14	F.	50	Involutional Mel.	4	years	Slight improvement
15	F.	54	Involutional Mel.	5	years	No change
16	F.	50	D. P.-Paranoid	2	years	No change
17	F.	48	Involutional Mel.	1	year	Slight improvement
18	F.	47	M. D.-Depressed	3	years	Slight improvement
19	F.	54	M. D.-Depressed	1½	years	Much improved
20	F.	55	Involutional Mel.	1	year	Slight improvement
21	F.	50	Involutional Mel.	2	months	Slight improvement

*This patient had had attacks yearly, each lasting about three months.

No physical complications whatever were encountered. Although the blood pressure rose from 10-20 mm. of mercury during the first week or two of the treatment, it tended to return to its former level later.

COMMENT

The number of patients studied is not large enough to justify statistical interpretations. It seems, however, that this combination of chemicals is a useful therapy for certain agitated and depressed patients. The writers are unable to predict which patients of this group will be benefited and must rely on a therapeutic test. This agrees with the results reported by Wooley,[2] for the use of benzedrine alone. Any benefit is usually apparent within a few days after starting treatment and certainly within the first two weeks.

Judging from the writers' experience, three uses may be made of this therapy. First, certain patients will respond to it who do not benefit from the separate chemicals. Second, a few patients will respond dramatically, and their periods of hospitalization may be shortened. Third, by using this medication and later discontinuing it, a larger number of patients can be trained to a more active hospital program.

As in any such therapy, abuse is possible if the objectives are not clearly understood. Sedatives may be prescribed simply to control the patient's agitation and, then, thoughtlessly continued over a long period. This leads to an immoderate and unjustifiable use of sedatives. The same abuse can be made of benzedrine and sodium amytal. If, however, the objectives are kept clearly in mind and the treatment is used experimentally with each patient to achieve a definite alteration of the patient's illness or hospital program, there need be no fear of its abuse.

SUMMARY

1. Twenty-one psychotic patients who presented various degrees of agitation and depression were treated with a combination of benzedrine (amphetamine) and sodium amytal.

2. Five patients were markedly benefited.

3. Nine patients were made more comfortable and accepted a more active hospital program which continued after the therapy was discontinued.

4. Three patients whose psychoses showed schizophrenic features were not benefited.

Acknowledgment

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THE SEDATIVE ACTION OF "DELVINAL" SODIUM IN DISTURBED PSYCHIATRIC PATIENTS
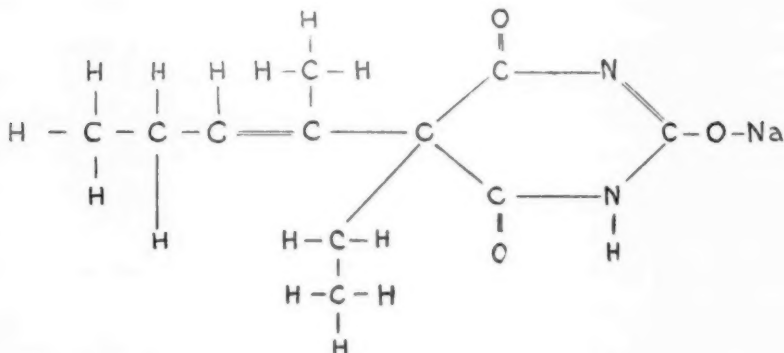
Preliminary Report

BY EUGENE DAVIDOFF, M. D.

The induction of sedation or narcosis is an important adjunct in the treatment of excited patients in a mental hospital. The management of disturbed individuals suffering from organic or functional mental conditions is aided considerably by the judicious administration of one of the many effective barbiturates. To be acceptable for use in disturbed psychotic patients, a barbiturate sedative should produce few toxic effects or sequelae, and there should be rapid induction of sedation or narcosis and a sufficient length and depth of narcosis. Effective sedation should be accomplished by the administration of relatively small doses. A wide margin of safety should exist and rapidly increasing tolerance or tachyphylaxis should not occur.

A number of new barbiturates were synthesized by Cope and Hancock[1, 2, 3] who developed an indirect method for the introduction of alkyl vinyl (unsaturated) groups into malonic and cyanoacetic esters. This procedure resulted in the production of many 5— (dialkylvinyl) —5-alkyl barbituric acids which were prepared by condensing substituted vinyl cyanoacetic with urea or guanidine and hydrolyzing the imino barbituric acids. Several of these barbituric acids, particularly those in which the substituted vinyl group contains five carbon atoms, were found to be potent hypnotics in animals. Of these, the sodium salt of 5 ethyl 5 (1 methyl —1 butenyl) barbituric acid ("delvinal" sodium), the structural formula for which is given in Figure 1, seemed most uniformly effective.

Hendrix[4] reported favorably on the action of "delvinal" sodium in animal experiments when its effects were compared with sodium amytal. The toxic reactions, particularly in regard to blood pressure and respiration, were apparently lessened. Clinically, in nonpsychotic patients, Hendrix found that one-half to one and one-half grains of "delvinal" sodium produced effective sedation. No significant toxic manifestations were detected. The induction time

was about 30 minutes. The period of sleep was usually more prolonged when the drug was given at night. Four to seven hours of sleep was the rule. Drowsiness after awakening was extremely rare.

SODIUM SALT OF 5-ETHYL5-(1-METHYLI-BUTENYL) BARBITURIC ACID

Fig. 1. "Delvinal" Sodium

Because of the favorable nature of this preliminary report in nonpsychotic patients, a study of the effects of "delvinal" sodium in disturbed mentally ill patients was begun in October, 1939. Observations were made with special reference to: 1. The general psychological effects. 2. The production of toxic effects on the central and autonomic nervous system, blood pressure, pulse, respiratory, gastrourinary and gastrointestinal tract, during or subsequent to narcosis. 3. The rapidity of induction of sedation and narcosis. 4. The length of narcosis. 5. The depth of narcosis. 6. The size of the single dose necessary to induce sedation or narcosis. 7. The effect of continued administration. 8. The development of tolerance. 9. The margin of safety.

METHOD OF PROCEDURE

A. Ten normal subjects received 32 mg. (½ gr.) of "delvinal" sodium at 2:00 p. m. To five of the individuals, the drug was administered daily for five days.

B. One hundred and ten psychotic patients received the medication for periods varying from one week to two months. The drug

was usually administered orally or by rectum late in the afternoon or in early evening. Twenty-five of the mentally ill cases were classified as manic-depressive psychoses. Thirty were schizophrenics. Ten suffered from agitations of the involutional type. Ten were psychoneurotics. There were 35 organic cases, 15 of the chronic type and 20 of the acute or toxic infectious type.

C. The study was begun with the moderately irritable patients of whom there were 30. An initial one-half grain of "delvinal" sodium was given. If sedation did not occur, another one-half grain dose was given at one-half-hour intervals until narcosis did occur.

D. With 80 severely disturbed patients, the minimum initial dose administered was one and one-half grains. Later, this was increased to three or six grains, depending on the mental and physical state of the patient. The dosage was increased hourly by one and one-half to three grains until narcosis was obtained. A modified form of continuous narcosis was administered to 15 of the most severely disturbed cases.

RESULTS

In evaluating the results, allowance must be made for the psychologic effects and other factors.[5, 6] However, despite obvious sources of error, the sedative action of the "delvinal" sodium was fairly uniform and produced few untoward results.

A. *Normal Subjects*

In all 10 individuals in this group the depressant effect on the central nervous system occurred within an hour, with drowsiness in from one to four hours. The length of narcosis was five to seven hours. No really toxic effects were noted during administration. However, a few mild, unpleasant gastrointestinal symptoms such as feelings of epigastric discomfort and a slight degree of nausea were observed in two subjects. One of these complained of dizziness. Mild effects due to the autonomic nervous system, such as perspiration, were noted in three instances. Pallor was observed in one case. Dilated pupils were seen in two subjects. Apprehensiveness occurred in one individual, and two felt relaxed and euphoric.

The feeling of weakness and fatigue noted in three cases was concomitant with the induction of the drowsy state. Some of the effects noted were, no doubt, of a psychologic nature.

After-effects were noted in two cases. One subject felt mildly fatigued. The other manifested a slight degree of incoordination, an increase in urinary output and mild gastrointestinal discomfort.

In five individuals there was no effect on the blood pressure. In three, the fall in the systolic blood pressure was 10 mms. In two, the fall was 20. Twelve hours after administration, the systolic blood pressure was lower in only one case. The diastolic blood pressure, pulse, respiration and temperature were not appreciably influenced in any of the 10 normal subjects.

B. *Disturbed Mentally Ill Patients*

1. GENERAL EFFECTS

The sedative effects varied with the individual, the diagnostic classification, the degree of excitement and the dosage employed. The best results were obtained in the psychoneurotic, manic-depressive manic and toxic cases. All 10 psychoneurotics responded rapidly. Sixteen of the 25 patients with manic-depressive manic or mixed psychoses evidenced rapid improvement. In 15 of the 20 toxic infectious psychoses, an accelerated rate of recovery was shown. The chronic organic patients and those with dementia præcox were more resistant; but the disturbed state was considerably ameliorated in all but eight of the most severely disturbed cases.

After a single effective dose prior to the induction of sedation or narcosis, there was a general slowing of thought, speech and motor activity. Some incoordination was noted. All patients became drowsy and slept for varying periods of time. The mood changes were temporary; but irritability and excitability diminished in 90 of the cases for periods varying from six to 24 hours. The next day, if the dose were not repeated, the disturbed activity usually reappeared, although in about 10 of the milder cases, the excitement was less marked. After repeated dosage, the irritable state diminished markedly in 102 of the patients.

2. TOXIC EFFECTS

a. *Central nervous system.* Doses of one to four grains caused effects similar to those experienced by the normal subjects and no alarming symptoms were encountered before the onset of narcosis or during it. A slightly exaggerated feeling of emotional or motor depression, uncomfortable sensations, such as heaviness of the head or limbs, unsteadiness of gait, headache and malaise, were noted in six patients. None became more excited, but increased irritability was noted in two of the six mentioned. A few after-effects were noted. The depressive "hangover" reaction was mild and occurred in only seven cases. Slight incoordination and some unsteadiness of gait were observed in these seven patients. When six to 12 grains were administered, a somewhat more frequent and greater degree of emotional depression and of fatigue was noted. Nine patients experienced these sensations. In only three of the most disturbed patients, was there impending syncope or weakness associated with vasomotor signs. These phenomena were transitory and not severe. Three patients appeared temporarily more excited. In no instance was the after-effect alarming but there were a few subjective sensations of discomfort. Fatigue, headache, depression, slowness or incoordination was noted in 12 cases. A moderate degree of irritability was noted in five cases.

b. *Blood pressure and pulse.* The systolic blood pressure fell from 15 to 35 mms. in 45 cases. The fall was not so marked when one to four-grain doses were used but was greater when six to 12 grains were given. A moderate rise was observed in six cases. On the succeeding day, the fall in systolic blood pressure remained 20 mms. lower in only 17 of the cases. An average decrease in the pulse rate of about 10 beats a minute was frequently noted, but this was not maintained for more than 18 hours.

c. *Miscellaneous effects.* Gastrointestinal complaints, such as nausea, belching and gastric distress, occurred in a slight degree in 14 cases. Effects due to disturbances of the autonomic nervous system, such as pallor, cyanosis, perspiration, light-headedness appeared in transitory form and mild degree in 14 cases. In three cases, where more than 16 grains were used, impending syncope was observed. The average drop in temperature when larger doses

were employed was about one degree. In but 15 cases were any of these untoward sequelae maintained or apparent after 12 hours; and they disappeared within 24 hours. They occurred usually when larger doses were employed. Signs referable to the respiratory tract were practically negligible. Genito-urinary effects were rare.

3.   RAPIDITY OF INDUCTION OF SEDATION AND NARCOSIS

The rapidity of onset varied with the individual, the size of the dose and the excited state of the patient. In different individuals, the average time necessary to produce sedation varied from 10 minutes to one hour except in 15 of the most excited cases. In the latter group, sedation occurred within one to two hours.

The average time necessary to produce narcosis varied in different patients from 30 minutes to two hours. In nine of the 15 most disturbed cases, sleep was induced in from two to three hours. In the other six of these 15 cases, narcosis was accomplished in four hours.

4.   LENGTH OF SEDATIVE EFFECT AND NARCOSIS

Continuance of the sedative effect varied from six to 24 hours. The average length of sedation was 10 hours when six grains or less were used and 15 hours when larger doses were employed. In four of the most disturbed cases, sedation lasted only six hours.

With doses up to four grains, the duration of sleep varied from five to seven hours, and averaged six hours. This rather constant length of narcotic effect was noted in all moderately disturbed patients. It was maintained after repeated doses in a given individual. When four to nine grains were required, the length of narcosis was from six to eight hours. When more than 12 grains were necessary in the 15 most severely disturbed patients, the narcosis varied from three to 10 hours. In four of the cases, narcosis lasted only three hours.

5.   DEPTH OF NARCOSIS

From a clinical standpoint a satisfactory degree of unconsciousness was obtained to render the drug useful in producing prolonged, continued or deep narcosis. Its action in this phase compared favorably with the other barbiturates, such as sodium amy-

tal. During the height of narcosis, it was impossible to rouse patients by the usual stimuli.

6. DOSAGE

The minimum initial dose was one-half grain. This was the lowest amount which produced even the slightest depressant effect. This dose produced satisfactory sedation in normals and in the very mild neurotics. In most of the psychoneuroses in this series, one and one-half grains was the optimum narcotic dose.

The 30 moderately irritable patients responded to one and one-half to four grains (0.1 to .25 gm.). Twenty-five of these patients required three grains or less. Of the 80 severely disturbed cases, a satisfactory degree of narcosis was established in 65 by the use of four to 10 grains (.25 to .6 gm.). Fifty of these patients required four to six grains, which appeared to be the optimum dose, since very few untoward effects were noted when this amount was employed. In 15 of the most excited patients, 12 grains (.75 gm.) or more was necessary to induce narcosis. Only three of these cases required more than 20 grains (1.25 gm.). One patient received 28 grains (1.75 gm.) and another, 32 grains (2 gm.).

7. EFFECT OF CONTINUED ADMINISTRATION

(*One Week to Two Months*)

After repeated daily administration of "delvinal" sodium, the toxic reaction did not tend to increase, and a minimum of ill effects was noted. The time of induction, length and depth of narcosis seemed to be evenly maintained. Particularly in moderately disturbed patients, smaller amounts would at times produce the same effect as larger initial doses. There is a possibility that a cumulative effect is present after continued administration in some cases.

8. TOLERANCE

As a rule, only a relatively slight degree of tolerance was established. Once the optimum effective dose was determined, that amount usually did not have to be increased. In the moderately excited cases, it has already been noted that after repeated administration, the dosage was frequently lessened. Tolerance, when pres-

ent, developed slowly and was noted in only the very disturbed cases. After discontinuance of administration, very few requested the medication. A euphorizing effect was infrequently noted. Idiosyncrasy to the drug was observed in only two cases.

9. MARGIN OF SAFETY

No appreciable degree of toxicity was observed in any case when 12 grains or less were employed. In only three patients who received 20 to 28 grains were there any more than average untoward effects observed. In those three cases, these were only mildly alarming and were transitory in nature. Except for impending syncope and a tendency for the blood pressure to fall, the symptoms were such as to cause only moderate discomfort; and in no cases did any serious threat to the patient's physical well-being develop. No antidotal measures were necessary. Since the patients were closely observed, the danger of untoward effects was naturally diminished.

COMMENTS

"Delvinal" sodium possesses the following favorable properties as a sedative in disturbed mentally ill patients. It is an apparently adequate and effective hypnotic which produces few toxic effects or sequelae and has a wide margin of safety. The induction of sedation and narcosis is rapidly accomplished. Relatively small doses (four to six grains) produce effective sedation in all but the very disturbed patients. Continued administration does not appear to increase the toxic effects. Tolerance is not rapidly or frequently established. In repeated medication, smaller doses frequently produce effects comparable to the larger initial doses. The length of narcosis averages from five to 10 hours but is frequently longer if increasing doses are employed and can be maintained by the addition of small doses. The depth of narcosis is sufficiently adequate for clinical use. "Delvinal" sodium is particularly valuable in the moderately disturbed cases, since relatively small doses are usually effective for a continued period.

At this early stage of investigation, "delvinal" sodium compares favorably with and appears to possess certain advantages over sodium amytal. As a rule, there are fewer and milder toxic effects during the narcotic action or as a sequel to it. Excitement

is not so likely to occur. A dose which is two-thirds that of sodium amytal usually produces comparable sedative effects. The induction of sedation and narcosis is more rapidly accomplished. The tolerance which the patient develops to sodium amytal is not so apparent when "delvinal" sodium is employed, and there is less need for subsequently increasing doses. The results appear to be more consistent and uniform when "delvinal" sodium is administered. There are apparently no noticeable effects on the respiratory system. Patients are frequently more cooperative and relaxed subsequent to the narcosis produced by "delvinal" sodium.

Further investigation is indicated in regard to the production of continuous deep narcosis; with respect to the effect on the blood pressure; and with reference to the development of tolerance, habit formation and idiosyncrasy—which appear to be infrequently encountered.

In psychotic states, "delvinal" sodium may be employed where sodium amytal[6] is indicated. We have used it alternately or in combination with other barbiturates, atropine derivatives, amphetamine (benzedrine) sulfate[6] and dextro-amphetamine sulfate. In patients with functional mental illness, those with psychoneuroses and manic-depressive manic or mixed psychoses seem to respond best. In the series studied about half the cases of involutional melancholia manifested a satisfactory degree of improvement. Of the organic illnesses, in the series studied, patients with infectious, metabolic or toxic psychoses (not due to oversedation with barbiturates) showed an accelerated recovery rate. Patients with chronic organic mental disease and those with dementia præcox proved most resistant to the sedative effects, but sedation was obtained in all the patients. In manic-depressive psychoses and in early cases of catatonic dementia præcox we have obtained more favorable results when dextro-amphetamine or amphetamine sulfate was used in conjunction with "delvinal" sodium than when other barbiturates were employed.

In addition to use in cases of the mental disorders listed here, the writer has used "delvinal" sodium alone or in combination with other drugs in cases of convulsive disorders and alcoholism,[6] and in postencephalitic syndromes. Hall[7] reported effective anal-

gesic action in obstetrical patients when "delvinal" sodium was combined with scopolamine.

SUMMARY

1. "Delvinal" sodium is a new sedative which except in the most disturbed cases, is effective in relatively small doses and possesses a wide margin of safety.

2. Its action compares favorably with that of sodium amytal.

3. It is of value in disturbed psychotic patients because of the mild and relatively infrequent toxic effects which occur following its administration; because of the rapidity with which it induces a satisfactory length and degree of sedation and narcosis, even after continued administration; and because a comparatively slight degree of tolerance is developed.

4. The best therapeutic results are obtained in patients with psychoneuroses, manic-depressive manic or mixed psychoses, toxic or infectious psychoses—and, to a lesser extent, in patients with involutional melancholia.

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A NOTE ON THE OCCURRENCE OF RUPTURED DUODENAL ULCER IN TWO PATIENTS PREVIOUSLY TREATED WITH METRAZOL

BY CLIFFORD D. MOORE, M. D., AND SAMUEL FRIEDMAN, M. D.

Interest in the sequelae associated with metrazol therapy has been devoted chiefly to the complications which may occur immediately after the injection of the drug and the resultant convulsion. Thus numerous reports have described the occurrence of dislocations,[1] or of fractures of the vertebrae[2] or long bones.[3] Other complications such as cardiac arrhythmias[4] or pulmonary abscess[5] also follow immediately or within a relatively brief period after the treatment. The possibility of complications—exclusive of neurologic damage—occurring, or at least giving rise to external symptoms, after a lapse of a number of months does not seem to have had serious consideration previously. The writers' interest in this possibility was aroused by the appearance of two cases of ruptured duodenal ulcer in patients who had received metrazol therapy a number of months previously. It is possible that this occurrence is entirely fortuitous; and so it must be emphasized that this report is merely in the nature of a tentative discussion. It represents an effort to stimulate interest in this problem and to arouse inquiry as to whether similar experience has been encountered by other clinics. Abstracts of the two case histories follow:

Case 1. J. K., a white male aged 25, was admitted to the Fairfield (Connecticut) State Hospital on June 9, 1936, as a transfer from the Norwich State Hospital. His mental illness dated from 1930, and he had had continuous hospitalization since September, 1932. Over a period of several years, the patient had lapsed into a completely autistic state. He was usually observed sitting in some corner, assuming an intrauterine position, eyes tightly shut, coat pulled over his head. Frequent spontaneous outbursts of laughter—apparently in response to auditory hallucinations—and numerous mannerisms were exhibited. The diagnosis was dementia præcox, hebephrenic type.

Metrazol therapy was initiated on March 13, 1939, and continued until April 16, 1939. During this period, the patient received 19 injections, at two to three-day intervals; he experienced nine major convulsions of average severity and 10 petit mal reactions. The

initial dose of 3 cc. of metrazol was increased to a maximum of 9 cc. Some measure of temporary improvement was noted; thus the patient was able to work out on the grounds, although a high degree of autism, general inaccessibility and manneristic behavior continued.

On January 29, 1940—some nine months after the termination of metrazol therapy—the patient suddenly became ill. Although he was generally uncooperative to satisfactory physical examination, it was apparent that he was suffering from an acute abdominal condition. This opinion was sustained by the surgical consultant, and immediate operation was performed. When the peritoneal cavity was opened, a large quantity of muddy brownish fluid was disclosed. At this point the patient's condition became so critical that further exploratory procedure was deemed inadvisable. Accordingly, drains were inserted and the wound closed. The patient rallied temporarily after various supportive measures; but, thereafter, his condition grew steadily worse and he died approximately five hours after the termination of the operation.

Unfortunately, autopsy was limited to the chest and abdomen. The significant gross pathological features were as follows: approximately 700 to 800 cc. of brown, fecal fluid were found in the abdominal cavity; the intestines exhibited a slight amount of fibrin on the surface and a few mild adhesions between coils of intestine; the duodenum showed a rounded ulcer, about one centimeter in diameter and with slightly indurated edges, situated on the posterior surface about one-half inch below the pylorus, and from this point a V-shaped opening extended about two-thirds of the distance around the duodenum; on the anterior surface of the stomach under the left lobe of the liver there was a rounded hemorrhagic area about two centimeters in diameter; the lower surface of the left lobe of the liver which was in contact with this portion of the stomach exhibited what appeared to be a mild, more or less stellate, laceration beneath the capsule; a small amount of hemorrhage was also found in the vicinity of the head of the pancreas. It might be mentioned that the possibility of trauma as an etiological factor in the production of the duodenal tear, mild laceration of the liver substance and slight hemorrhage was entertained by the pathologist at the time of postmortem examination. This possibility was

carefully investigated later; and no conclusive evidence for it could be elicited. In any event, the duodenal ulcer was unquestionably chronic, and non-traumatic in origin. Microscopically, the lesion in the duodenum showed necrosis of the surface of the mucosa with lymphocytic infiltration and edema underneath. At one point, a deep tear was seen, with a small amount of fibrin and infiltration of polymorphonuclear leukocytes on the surface. The lesion in the liver was revealed as hemorrhage just beneath the surface with a few strands of fibrin and only slight cellular reaction around the area of hemorrhage. The causes of death were established as: rupture of duodenal ulcer with long laceration of the duodenum; acute general peritonitis; hemorrhage into liver tissue, peritoneal fat, the head of the pancreas and lesser curvature of the stomach.

Case 2. J. B., a white male aged 32, was received at the Fairfield State Hospital as a transfer from the Connecticut State Hospital on September 28, 1933. He had been ill for about two years. Chiefly because he had scored a mental age of nine years, one month on a psychometric examination, the diagnosis of psychosis with mental deficiency had been made originally. However, in view of the marked scattering exhibited in the psychometric test and the prominence of hallucinatory experiences, the diagnosis of schizophrenia engrafted on mental deficiency seemed probable. His clinical course was rather variable. At times he got along quite well and he was able to leave the hospital for home visits of varying duration; but he would also have episodes during which he became disturbed, overactive and profane, and reacted violently to vivid hallucinations in both auditory and visual spheres. Because of these marked hallucinatory experiences, and, inasmuch as the patient himself was eager to try any treatment to rid himself of these phenomena, metrazol therapy was initiated on August 23, 1938. Following the first treatment, which was accompanied by a grand mal convulsion, the patient asserted that his hallucinations had disappeared. The treatments were discontinued after three further injections, which were productive of only petit mal reactions and of increasing resistiveness and uncooperativeness on the part of the patient. He seemed to get along very well temporarily, but in November he again complained of hallucinations, and he was noisy and upset in response to them. Another series of metrazol

treatments was administered; and on this occasion, he received eight injections, with six grand mal and two petit mal reactions. The dosage ranged from 4 cc. to 7 cc. of metrazol. After the third treatment, the hallucinations again disappeared. The patient seemed generally improved, and he was paroled home but was returned to the hospital in February, 1940.

On May 19, 1940—some 17 months after the termination of metrazol therapy—the patient suddenly became ill. Examination revealed marked tenderness and rigidity of the abdomen, especially on the right side. Immediate operation was advised by the surgical consultant. On opening the peritoneal cavity a moderate amount of free fluid was found. The appendix was obviously not the source of this condition; and further exploration revealed a ruptured ulcer, approximately one centimeter in diameter, on the anterior surface of the duodenum several centimeters below the pylorus. This was repaired. The patient made a more or less uneventful recovery from the operative procedure. It might be indicated that in neither of these cases had there been any antecedent history of gastrointestinal disturbance.

DISCUSSION

As pointed out, previously, it is possible that the occurrence of these two cases of ruptured duodenal ulcer in patients previously treated with metrazol is entirely coincidental. On the other hand, the supposition that there may be a causal relationship between the preceding metrazol therapy and the later gastrointestinal pathology is also quite tenable. Such a theory is based, of course, on two factors: first, the knowledge that lesions of the central nervous system have been productive of peptic ulcers; second, experimental evidence to the effect that metrazol therapy may lead to definite histopathological changes in the brain.

The neurogenic origin of peptic ulcers was first suggested by Rokitansky in 1841. In succeeding years a number of investigators were able to produce gastric lesions by injury to the central nervous system. In recent years this concept was given renewed and authoritative support by the work of Cushing[6] and by further reports from other investigators.[7] A recent excellent review by Vonderahe[8] summarizes much of this work and also reaffirms the the-

ory that lesions in one of several areas of the central nervous system may be directly related to the production of peptic ulcer through pathologic alteration of visceral centers and pathways.

Although evidence both pro and con is relatively meager, a number of investigators[9] have indicated the occurrence of definite histopathologic abnormalities in the brain following experimental metrazol therapy on animals, and such observations suggest that similar pathologic changes may occur also in human patients under metrazol treatment.[10]   Strecker and his associates[9a] found changes in the cells of the frontal and parietal regions of the cerebral cortex in several animals and abnormalities in portions of the hypothalamus in other experimental animals.   The latter observation is of particular interest in view of the marked attention and interest which have been devoted to the diencephalon as a locus of important visceral functions.   However, other areas may also be intimately concerned with the integrity of the gastrointestinal tract; for example, the frontal lobes or the vagal and sympathetic nuclei.[8] Certainly, in view of Pavlov's work, one cannot question the influence of the cerebral cortex on the autonomic nervous system. Other experimental work has indicated the significant rôle which may be played by lesions of the frontal lobes in the production of pathological changes in the stomach and intestines.[8, 11]   Thus, despite the acknowledged importance of the diencephalon in this regard, it is probable that lesions in any one of several areas in the brain may be related to the production of peptic ulcer or other gastric pathology.   Furthermore, it may not be necessary to postulate the production by metrazol of actual histopathologic changes in the brain in these two patients.   It is possible that the effect of metrazol in this regard may be in the realm of physiological pathology and that the integrity of the autonomic nervous system is occasionally sufficiently disturbed by metrazol to initiate the formation of gastric lesions.

One may question finally whether the relatively long period intervening between the administration of metrazol therapy and the occurrence of acute gastric symptoms in these two cases, namely, nine months and 17 months, respectively, does not render the causal relationship rather remote.   In this regard it is interesting to note a recent report by Richter and Traut[12] who described the occur-

rence of gastric symptoms in a patient six months after the onset of an encephalitic process. It was assumed that the symptoms were due to an acute peptic ulcer caused by a lesion of the inter-brain. Thus it is possible that a fairly long interval may elapse between the initiation of cerebral damage and the production of a gastric lesion. One must also recall that a psychotic patient may suffer subjective symptoms for prolonged periods of time without giving voice to complaints. Certainly the first patient described here was so completely autistic that he may well have endured symptoms for many weeks or months before the actual rupture of his duodenal ulcer.

SUMMARY

Two cases of ruptured duodenal ulcer occurring in patients previously treated with metrazol are described. The theory that there may be a causal relationship between the preceding metrazol therapy and the later gastrointestinal pathology is advanced.

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ory that lesions in one of several areas of the central nervous system may be directly related to the production of peptic ulcer through pathologic alteration of visceral centers and pathways.

Although evidence both pro and con is relatively meager, a number of investigators[9] have indicated the occurrence of definite histopathologic abnormalities in the brain following experimental metrazol therapy on animals, and such observations suggest that similar pathologic changes may occur also in human patients under metrazol treatment.[10] Strecker and his associates[9a] found changes in the cells of the frontal and parietal regions of the cerebral cortex in several animals and abnormalities in portions of the hypothalamus in other experimental animals. The latter observation is of particular interest in view of the marked attention and interest which have been devoted to the diencephalon as a locus of important visceral functions. However, other areas may also be intimately concerned with the integrity of the gastrointestinal tract; for example, the frontal lobes or the vagal and sympathetic nuclei.[8] Certainly, in view of Pavlov's work, one cannot question the influence of the cerebral cortex on the autonomic nervous system. Other experimental work has indicated the significant rôle which may be played by lesions of the frontal lobes in the production of pathological changes in the stomach and intestines.[8, 11] Thus, despite the acknowledged importance of the diencephalon in this regard, it is probable that lesions in any one of several areas in the brain may be related to the production of peptic ulcer or other gastric pathology. Furthermore, it may not be necessary to postulate the production by metrazol of actual histopathologic changes in the brain in these two patients. It is possible that the effect of metrazol in this regard may be in the realm of physiological pathology and that the integrity of the autonomic nervous system is occasionally sufficiently disturbed by metrazol to initiate the formation of gastric lesions.

One may question finally whether the relatively long period intervening between the administration of metrazol therapy and the occurrence of acute gastric symptoms in these two cases, namely, nine months and 17 months, respectively, does not render the causal relationship rather remote. In this regard it is interesting to note a recent report by Richter and Traut[12] who described the occur-

rence of gastric symptoms in a patient six months after the onset of an encephalitic process. It was assumed that the symptoms were due to an acute peptic ulcer caused by a lesion of the interbrain. Thus it is possible that a fairly long interval may elapse between the initiation of cerebral damage and the production of a gastric lesion. One must also recall that a psychotic patient may suffer subjective symptoms for prolonged periods of time without giving voice to complaints. Certainly the first patient described here was so completely autistic that he may well have endured symptoms for many weeks or months before the actual rupture of his duodenal ulcer.

SUMMARY

Two cases of ruptured duodenal ulcer occurring in patients previously treated with metrazol are described. The theory that there may be a causal relationship between the preceding metrazol therapy and the later gastrointestinal pathology is advanced.

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BOOK REVIEWS

What Price Alcohol?   A Practical Discussion of the Causes and Treatment of Alcoholism.   By ROBERT S. CARROLL, M. D.   With preface by Adolf Meyer.   The Macmillan Company, New York, 1941.   362 pages with index.   Price $3.00.

Dr. Carroll is founder and medical director of Highland Hospital, Inc., Asheville, N. C., and has, Dr. Meyer notes in his preface, "for years proved his hospital one of the most effective systematic agencies in the treatment of victims of alcohol, along lines that are also his methods and principles in the treatment of the rank and file of mental disorders as he sees them in the axiom : *mens sana in corpore sano*—a healthy person in and through a healthy body."

"I write of a toxic-tainted humanity," says Dr. Carroll, "naming food-intemperance as the arch enemy, alcohol as its viceroy." There are those of fortunate heritage, he holds, who are masters at their own table of their own tempers and passions, who use and never abuse alcohol, but he considers these exceptions remote from the vast many who, because of defective heritage, are submerged.

Addressing himself—presumably—to the laity, Dr. Carroll sets out the theory that the basis of a neurotic's nervousness is the inheritance of a second-class blood-brain barrier and that here is an explanation of the distinction between those who can and those who cannot carry their liquor. He says confidently, "The day approaches when the psychiatrist will understand completely the relations between alcohol and the brain. Then he will by tests as sure as those which today disclose one's susceptibility to scarlet fever, indicate the alcoholic allergie." It is by coincidence that a report of experimentation with the Nagle alcohol susceptibility skin test, which appears in this issue of THE PSYCHIATRIC QUARTERLY, lends encouragement to Dr. Carroll's hope.

Dr. Carroll explains the alcohol problem from the psychologic viewpoint in language the layman can understand, then presents "a series of pragmatic chapters in which the practical approach evolved by recent scientific study" is associated with the experience of many experts. Finally, he sums up with a series of "conference approaches" the educative work of psychotherapy with the alcoholic. In his treatment, cigarettes are prohibited as well as alcohol; and 10 days after discontinuance of alcohol, psychotherapy in the form of reeducation is begun.

Dr. Carroll gives numerous case reports—or rather illustrative histories —of the results of the abuse of alcohol. Since he deplores the emotional approach of the unscientific leaders of past temperance movements, it is somewhat surprising to find his illustrations written in such terms as those used in the case of "Rev. M." for whom Communion wine always spelled "downfall." "By Monday noon, unless rescued, he would be in the midst of an orgy of unrighteous living which would only terminate in a ravenous feast of Bacchus . . . unfrocked for the nonce in unchecked revelry and uninhibited surrender to license." The seeker for scientific truth may be pardoned if this language recalls the emotional approach of the past which Dr. Carroll deplores.

And again: "Women are more essentially emotional than men. I have long felt that the use of alcohol robs woman of her finest qualities much more rapidly than it degrades man. The fineness that makes for her feminine charm is as soon blown away as ashes, by the siroccic breath of drunkenness. A drunken woman seems to wallow in a deeper gutter than man at his worst."

Probably Dr. Carroll would be the first to say that his attitude toward alcohol—and toward life in general—is colored by emotion. Describing his father as a rarely delightful professional man but a confirmed neurotic, he says, "Nor am I more grateful for any heritage than that sensitive nearness to my surroundings made possible by a wisely utilized share of father's neuroticism."

Yet it may be questioned whether emotion and science ever make a much better or a much safer mixture than alcohol and gasoline. In a work addressed to the general public, science and emotion form a peculiarly unfortunate mixture, since the general public lacks the data to determine which is which. And that part of the public which Dr. Carroll seeks particularly to influence, the users of alcohol, may react, in addition, in a way to defeat the purpose for which he wrote his book. They may see, in his emotional language, the sawdust-trail preaching of a Billy Sunday and may reject in resentment whatever of scientific value there is in his work.

Aus Leiden Freuden.   By THEODOR REIK. Imago Publishing Co., Ltd. London, 1940. 404 pages. Price not stated.

Dr. Theodor Reik, internationally known writer and psychoanalyst, offers to us again an aggregate of his intensive studies. He follows in part his teacher, Freud, but also goes against and beyond him. The book is written in German. Its title, *Aus Leiden Freuden,* may lose some of its concise meaning when translated. We may understand it as "through suffering to pleasure" or "pleasure from suffering."

Dr. Reik attempts to penetrate to new and better knowledge of the character and characteristics of masochism. He suggests that Freud has not solved the problems of masochism, but has paved the way. According to Dr. Reik, masochism has its original source in sadism. He distinguishes sexual masochism, a perverse manifestation of the sex drive, and desexualized masochism, which he calls ''social masochism.'' The latter was known, but not well defined by other analysts, who were inclined to favor the name ''moral masochism.''

Masochism as a sexual perversion has been better known than the mode of life or philosophy of life presented here as social masochism. The connections of masochism to sadistic phantasies, feelings of guilt, religion, culture, the neuroses and present-day world events can be better understood through this intense study and clear presentation of masochistic phenomena. The author points out that our times are full of masochism, that the masochistic character causes much unnecessary suffering. The *victory through defeat* may explain some of the destructive forces at work. The dark unconscious motives in individuals and peoples are uncovered for us; and some of the riddles of masochism seem to be understood or solved.

The typographical errors and minor flaws in the arranging of chapters will probably be avoided in a reprint of the volume. This book is highly instructive, and is recommended to all those who strive for knowledge and insight of the mysterious and dark recesses of the human mind and the motivations of human behavior. An English translation would enhance its usefulness and seems indicated.

Predicting Success or Failure in Marriage. By ERNEST W. BURGESS and LEONARD S. COTTRELL, Jr. Pp. 472. New York, 1939. Prentice-Hall, Inc. Price $3.25.

Educators have become much disturbed about marriage and, more and more, are devising ways and means of preparing college students for more harmonious mating. Their first efforts, years ago, took the direction of instruction in homemaking, cookery and marketing, on the theory, perhaps, that the shortest way to a man's heart is *via* his stomach. That was all very well for a starter, but with Hollywood and Reno flourishing as never before, it soon became evident that the better home idea was inadequate. Knowledge of diets, vitamins and calories rates high among the accomplishments of modern brides, but without physical attraction between the couple it is quite inadequate to keep the home fires burning.

It was a long time before educators (using this term in its broadest sense), could muster courage to face facts and offer courses in sex hygiene, but when and where this subject was properly taught the response on the

part of students of both sexes was immediate and enthusiastic. Prof. Ernest R. Groves of the University of North Carolina is well known for his successful teaching (if success is to be measured by popularity) in class-room and lecture hall. He and his wife, Prof. Gladys H. Groves, have demonstrated that practical instruction in all that pertains to sex can be imparted in the written and spoken word with complete frankness and in the same scientific attitude as would be found in the teaching of botany or physiology. The movement to ban the prudery and secrecy of sex physiology should and will go on and it will move in time from the college down into the high schools and to the parent-teacher associations as well as to other socially-minded groups of adults and students. Children have always re-ceived sex instruction at an early age, but usually it was on the street cor-ners or in the playgrounds. It should be possible to devise a plan of in-struction by which the evil influences and errors of the amateur street cor-ner instructors may be anticipated and nullified.

In "Predicting Success or Failure in Marriage," Prof. Burgess and Prof. Cottrell approach the topic from a wider perimeter. Their approach is by way of the social case work method. They recognize that but little infor-mation has actually been available, that too much of the writing on this subject in the past has been composed of generalizations based upon little clinical data, and that statements and conclusions have not been based suffi-ciently upon factual evidence. The basis of their own work is information obtained from 526 average couples who submitted their life histories for study. Practically all were fully cooperative in the project. Among them were those who declared themselves to be contented and happy in marriage, others frankly unhappy and contemplating separation. Between these ex-tremes were found all degrees of partially successful and inadequate adjust-ment to one another. This group seems to have been a cross section of an average American community, rich and poor, working wives and couples independent financially, teachers, professional persons and others with various religious and cultural backgrounds.

Many difficulties are to be encountered in attempting to draw sound con-clusions from situations which involve emotional elements: love, hatred and all the varying motives which suggest or prompt one to enter the mar-riage relationship besides romance. Here one may expect to encounter in-tangible elements that may work havoc with tables, graphs and charts. The individual himself may unwittingly mislead because of "blind spots" which obscure his insight. There are relatively few individuals who can give unbiased and trustworthy accounts of their motives and promptings. The authors themselves are by no means oblivious to these weaknesses in their thesis, but with courage, ingenuity and frankness, have sought ways

and means to overcome them. To the reviewer, it seems that more of the Freudian technique must be applied by the investigator to correct mis-judgments on the part of the subject of his own motives. The authors make use of much knowledge that has been gained from psychoanalysis and seem to have employed upon occasion its technical mode of investigation with understanding.

The book is one which marks a definite advance in sociological methods and promises still further gains in understanding human behavior when applied to other situations. Dr. Cottrell has already taken part in such a study—one aimed to predict the success to be expected in paroles from prisons. Perhaps one should not expect too much of such a method; so much depends upon future events, not predictable far in advance, which might make an individual's whole prospect different from what was con-fidently anticipated. But though no one would expect predictions to be more than approximations of results, the method is sound; and exceptions will be accepted as such.

The book deserves wide circulation and careful reading by students of sociology and welfare workers. It is to be hoped that other editions will appear in due time which will include still larger numbers of case studies—and perhaps some of the tables which seem to be of little value might be deleted. The printing on the dust jacket could be made less cheap and sensational. It promises more exact information than the book furnishes. It is evidently the work of someone, not professionally trained, who should be employed in commercial fields.

Family Behavior. A Study of Family Relations. By BESS V. CUNNING-HAM, Ph.D. Second edition, revised. W. B. Saunders Company, Phila-delphia and London, 1940. 527 pages with 10 illustrations. Cloth. Price $3.00.

This is the second edition of a book that first appeared in 1936 and en-joyed a considerable popularity among educators. The author remarks that such radical changes have occurred in human experience and family relationships during recent years that even the most stable of adults finds it hard to adjust himself. The problems which were pressing for solution a decade ago must be evaluated from new points of view, based partly upon the rapid changes which have taken place in world affairs, but also as a result of diligent study of social science. Family and community life are being subjected to intensive study and analysis as never before. Hardly a month passes that a new book does not appear on some phase of this general subject. The author offers to do no more than to submit to readers a consideration of problems as they appear to be at this time.

In the new edition some changes are observable; an entire chapter has been added to provide an historical background.   In the interpretation of family life and social problems much new material has been included. Much has also been added in the treatment of the dollars and cents of family life. The whole field of family relationships is very thoroughly covered.   This includes not only the attitudes and relations of the members to each other, but the neighbors, the community and community activities and the employment of leisure.

The book is recommended as suitable for a textbook for high school and college students, but also its readable style and scope will make it of interest to the general reader.

The Neuroses in War. By several authors under the editorship of Emanuel Miller, M. A. (Cantab) M. R. C. P., D. P. M. (Cambs) with a concluding chapter by H. Crichton-Miller, M. D., F. R. C. P.   The Macmillan Co., New York, 1940.   210 pages with appendices, bibliography and index. $2.50.

''We have no occasion to apologize for the appearance of this book.'' So says Dr. Miller in his preface; and so will say those psychiatrists who partake of the privilege of studying it.   Although interest in the subject is still academic among the profession in this country, it is becoming increasingly more probable that it may become practical.   Certainly those physicians now actively serving in our national defense program should avail themselves of the excellent material presented in the volume.   As it points out, the War Office Committee of Enquiry on Shell-shock declared in Great Britain in 1922: ''It would seem very desirable that a limited number of R. A. M. C. officers should undergo a complete course of instruction of this type (Psychology, Neurology, Psychiatry, Psychopathology and Clinical Instruction) . . .'' Now does not appear too soon for such a program to be instituted in this country; and for such instruction, this book may well serve as the text in its field.   The need for the program is well documented by facts learned from 1914 to 1918 in France and mentioned briefly in the book.

Under the editorship of Dr. Miller, 11 psychiatrists have contributed to this volume.   Six of them saw service as such in World War I; and two others are now in emergency services in the United Kingdom.   These facts serve to give their words the weight of practical experience and accomplishment.   It is widely known that, not until World War I, did psychiatry

gain the intra-professional standing which it deserved and also that, from the experiential material collected in connection with that conflict, came some of the bases of the subject as it is known today. Furthermore, the experiences of 1914 to 1918 must stand as the basis of our preparations now—with due regard for the changes occasioned by the war of movement (as opposed to the war of position) and to the extensions of ''total war'' to include the worker or the citizen at home as an active participant in the mortality and casualty-producing elements of war. Combining this background and the professional capabilities of the authors, the volume becomes authoritative.

The outstanding feature of the book is the stress on practical applications, on methods of treatment and on detailed descriptions of certain techniques. These subjects occupy nearly the entire latter half of the volume. The first half surveys the literature, outlines modes of onset of the neuroses in war, gives case studies with psychosomatic relationships, documents the differential diagnoses of the psychoneuroses in war and outlines psychopathological theories of neuroses in wartime. Then follow three chapters on treatment, one on the organization of the psychiatric service and one on prophylaxis and treatment of civilian casualties.

It is pointed out that in combat, effective treatment of the neurosis is best carried out soon after the individual becomes a casualty, at a specially constituted psychiatric center not too far removed from the zone of fighting. The essential differences between manifestations of the neuroses under war stresses and in the usual course of civil life are examined. Here, the authors report that superficial treatment is far more effective in war neuroses than in civil conditions and is most often all that is needed to effect recovery and return of the patient to service. Techniques are described, though it is acknowledged that they must vary according to the patient's illness and according to the abilities of the psychiatrist. To quote: ''It cannot be emphasized too strongly that in dealing with neuroses in war we can have no hard-and-fast rules for therapy; we can have general principles based on our knowledge of psychotherapy, but no rule-of-thumb treatment.''

The chapter on ''The War of Nerves'' and civilian reactions to bombings, with suggestions for prophylaxis elaborated on a psychological basis, is nothing short of excellent and should be required reading for all civilian authorities in areas possibly subject to the tragedy of air attack. Emphasis here is properly placed on the advisability of having an assigned task for each person, no matter how small it may be, in time of emergency, with a minimizing of the safety-first evacuation principle.

Dr. Crichton-Miller writes a concluding chapter in which he summarizes the material, lays stress where stress is due and further explains the psychopathology of anxiety-hysteria. The book concludes with appendices, including a suggested classification of psychological disorders of war and a brief but admirably handled "Psychiatric Pharmacology."

One's feelings are ambivalent concerning the volume, regretting the necessity of the material in it and at the same time hailing it for its masterly yet succinct presentation of the subject.

Psychology in Education. By HERBERT SORENSON. McGraw-Hill Book Company, Inc., New York, 1940. 489 pages, with index. Price $2.75.

Functionally considered, the educator is to the psychologist what the engineer is to the scientist—a careful utilizer of scientific knowledge for the achievement of practical ends. Thus the primary problem confronting the educational psychologist (would not "psychological educator" be a truer designation?) who aspires to successful textbook authorship is always that of consummating a utilitarian interrelationship between relevant psychological data and imperative pedagogical needs. In the reviewer's judgment, by far the best such correlation yet made is now available in this volume from the hand of President Sorenson of the State Teachers College, Duluth, Minn.

Experimental studies provide the basic source material throughout, yet their data are woven into the interpretive text in such splendid fashion as to become intrinsically interesting even in themselves. Although the conventional educational psychology textbook topics such as intelligence, memory, learning, attention, fatigue, transfer, motivation, etc., receive full treatment, the author well recognizes that the problem confronting modern teachers is much more than that of efficiently imparting knowledge of subject matter. His book is therefore much concerned with physical, mental, emotional and social growth; with the determination of desirable traits and attitudes; and with the effects of interacting nature and nurture upon the development of character and personality. In the author's own words:

"Because the education of pupils is much more than the learning of subject matter, the contents of this text concerns itself with the fuller problem of pupil adjustment. Methods of effective learning demand the serious and devoted attention of the educational psychologist, but so also do the problems of growth, emotional reactions, behavior, and personality of pupils, capacity to learn, measuring and marking achievement, and the extent that pupils' abilities and characteristics can be and are determined by hereditary and environmental forces . . . Stress is laid on the emotional

reactions and personal adjustment of the pupil so that the teacher in his effort to stimulate his pupils to learn subject matter will not overlook the pupil, with his feelings, emotions, and personal problems.''

In organization and format the entire volume is most commendable. Each chapter begins with an overview addressed to the reader, consisting of directions for study, items and major principles to emphasize, list of objectives for the chapter, and provocative questions to be answered. Boldfaced section and paragraph headings add greatly to the encyclopedic usefulness of the volume, as do the short summaries following each chapter. Dynamic, thought-provoking problems and exercises listed for each chapter force the student to go beyond mere verbalisms into vital problem-situations themselves. The references cited are divided into two parts: basic and optional, in order that superior or interested readers may pursue problems considered beyond the minimum essentials if they so desire. A final glossary of definitions and descriptions of technical terms will prove extremely useful to the beginner in the field, whether he be college student or intelligent adult layman. As an introductory textbook in the field of educational psychology, this volume has no peer known to the present reviewer.

Social Work Year-Book, 1941—Volume 6. Published by Russell Sage Foundation, 130 East 22nd Street, New York City. 760 pages. Price $3.25.

The 1941 volume of The Social Work Year-Book, like its predecessors, gives a concrete word picture of ''organized activities in social work and in related fields, as understood and practiced today.'' Russell H. Kurtz, the editor, observes that ''sweeping changes have occurred in the pattern and scope of American social work since the publication of the first Social Work Year-Book in 1930.'' The present volume is the sixth in the series published biennially, starting with that first year-book, each one independent of the others.

In the 1941 book, Mr. Kurtz has presented, in effect, a factual encyclopedia containing a record of the present situation which may well come to be regarded as a picture of social work at an important crossroads in American life. This quotation from Mr. Kurtz seems pertinent here: ''It remains to be seen what effect the current national drive toward preparedness and defense will have on the social progress so laboriously achieved in recent years.''

The book has two major sections. Part I, ''An authoritative record of organized activities,'' is made up of 83 signed articles written by recognized authorities and covering the wide range of social welfare work, both

public and private. These articles are descriptions of functions, organized activities and programs. Each has an extensive and comprehensive list of references to literature. The complete bibliography comprises 1,360 separate books and pamphlets and 450 magazine articles. Part II of the yearbook is a directory of 1,023 national and state agencies in social work and related fields.

The book has a carefully arranged index, which is extremely helpful as an aid to finding information easily. This adds much to the volume's usefulness. Both the busy executive and the student will appreciate this arrangement.

Bacteriology in Neuropsychiatry. By NICHOLAS KOPELOFF, Ph.D. Charles C. Thomas, Springfield, Ill., 1941. 316 pages. Price $4.50.

The author has summarized and evaluated, from the large amount of literature, that pertaining to the status of bacteriology and immunology in nervous and mental diseases, especially from the psychosomatic viewpoint.

For purposes of description, the diseases of known etiology are divided into primary and secondary involvement of the nervous system; the latter is subdivided into manifestations due to direct invasion, neurotoxins, toxic and other factors. The etiology, symptomatology, pathology, and, where possible, laboratory tests, as well as treatment, are discussed.

The discussion of diseases of unknown etiology, including a résumé of the large amount of work done on the functional psychoses, as well as that concerned with immunology of the central nervous system, is, in the opinion of the reviewer, a most valuable service, covering a large amount of recent literature in various languages in these interesting fields.

The subject matter, while stated in a condensed manner, is presented in a clear, interesting form, eliminating or merely enumerating questionable claims. Each chapter is concisely summarized, followed by relevant references. Authors and general indices complete the book.

This volume should be of interest to the clinician, as well as to the investigator in neuropsychiatry.

Psychiatry for the Curious. By GEORGE H. PRESTON, M. D. Illustrated with sketches by the author. New York and Toronto. Farrar and Rinehart, Inc. 1940. Cloth. 148 pages. Price $1.50.

ERRATUM

Owing to a typographical error in the review of this book in the January number of THE PSYCHIATRIC QUARTERLY, the price was stated to be $2.50. The publishers have called attention to the fact that the price of the book, postpaid, is $1.50.
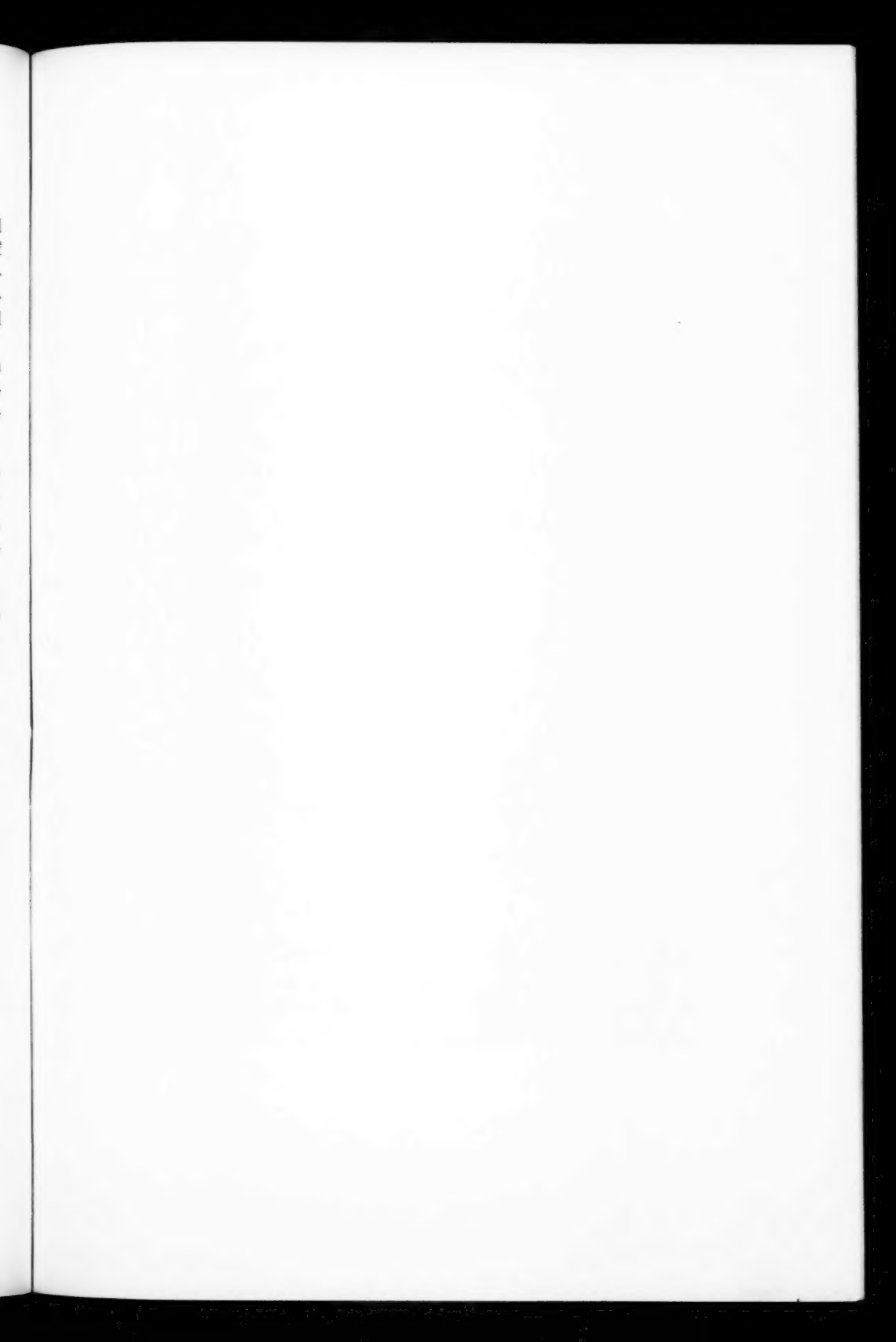
KENNETH KEILL, M. D.

KENNETH KEILL, M. D.

Dr. Kenneth Keill, first assistant physician at Pilgrim State Hospital, and acting medical inspector for the New York State Department of Mental Hygiene since October 15, 1940, was appointed by Commissioner William J. Tiffany as superintendent of the Willard State Hospital, effective March 10, 1941.

Dr. Keill was born in Canada, at Collins Bay, Ontario, on October 25, 1896. He attended the Collins Bay village school and received his high school education at Kingston Collegiate Institute, from 1907 to 1912. He then attended Queens University and Medical School for a course which was interrupted by a year spent at Camrose Normal School, Alberta, and two years in the Canadian army. He was graduated in 1922 and interned at St. John's Hospital, Brooklyn, until 1924, following that by two months special interneship at the Robert Packer Hospital in Sayre, Pa.

He entered the New York State Hospital service as interne at Binghamton State Hospital on May 1, 1924. He was appointed assistant physician January 1, 1925, and was promoted to senior assistant physician December 11, 1926. On October 15, 1929, Dr. Keill was appointed first assistant physician at Letchworth Village. He was transferred to similar positions at Kings Park State Hospital June 1, 1931, and to Pilgrim State Hospital December 1, 1931.

On May 17, 1924, Dr. Keill was married to Dorothy B. Langdon of St. George, Staten Island. They have two sons, Stuart Langdon, 13, and William K., eight.

Dr. Keill is a member of the New York State Medical Society and of the Suffolk County Medical Society, a fellow of the American Psychiatric Association and a diplomate in psychiatry of the American Board of Psychiatry and Neurology.

NEWS AND COMMENT

GUESSES ARE NOT STATISTICS
(Editorial)

Certain reports have been made recently which tend to show a surprisingly high incidence of alcoholic mental disease in the United States. Some of the figures are so startling as to call, perhaps, for a critical and dispassionate examination.

For one example, Dr. Lawrence Kolb of the United States Public Health Service is quoted in the March, 1941, *Mental Hygiene News* as asserting that more than one out of every 10 patients admitted to mental hospitals for the first time in the United States are victims of alcoholic psychoses or alcoholism. For a second, Dr. Neil A. Dayton of Boston is quoted by Dr. Robert S. Carroll, in a book reviewed in this issue of THE PSYCHIATRIC QUARTERLY, as including in his final report of a 12-year survey of certain psychiatric problems the declaration that "more than one-fifth of all United States mental patients are alcoholics."

It would be interesting to know upon what assumptions these authorities base their figures. The same issue of *Mental Hygiene News* which printed the report of Dr. Kolb's estimate, printed a summary of the 1940 annual report of the New York State Department of Mental Hygiene. That report showed that for the fiscal year ending June 30, 1940, first admissions to the civil State hospitals, including Syracuse Psychopathic Hospital, but excluding the State schools and Craig Colony, which do not receive alcoholics, totaled 13,504. Of these 13,504 first admissions, 868, or approximately 6.4 per cent, were reported as due to alcohol. Dr. Horatio M. Pollock, director of mental hygiene statistics for the State department, has made a careful study of the incidence of the alcoholic psychoses in the civil State hospitals over a period of 30 years. He found that the first admission rate for alcoholic mental diseases had been less than 8 per cent of all first admissions for all years between 1918 and 1938, inclusive. He gave the rate for 1937 as 7.0 per cent and for 1938 as 6.6 per cent, figures far under the estimates attributed to Drs. Kolb and Dayton for the prevalence of alcoholic mental diseases in the country as a whole.

There is every reason to believe that the New York statistics represent with great accuracy the conditions in New York's civil State hospitals.

They are compiled carefully on the basis of schedules which are uniform for all those hospitals. As to the use of these schedules, Dr. Pollock notes, "The hospital physicians in making diagnoses and in supplying other data called for by the schedules have been guided by a statistical manual which was carefully prepared by a committee composed of representatives of the State hospitals and the statistical bureau." The diagnoses are made in all instances by competent psychiatrists after careful examination; and the New York statistics are prepared from the psychiatrists' findings by thoroughly trained statisticians. The civil State hospitals refuse admission to nobody who is in need of hospitalization for mental illness; and the statistics, therefore, reflect in a highly accurate fashion the incidence of alcoholic mental diseases in the whole population of the State.

Comparable data are available for a number of other states with well-developed mental hygiene programs, but not for the entire United States. Dr. Victor Hugh Vogel of the United States Public Health Service described, last autumn, a state he had recently visited as having "no psychiatric clinics of any kind, only two psychiatrists in private practice and two crowded state institutions, with one doctor for every 500 patients." If such a state were to report 2 per cent or 20 per cent of first admissions with alcoholic mental diseases, could anybody take its figures seriously? What sort of diagnoses could be expected from such overworked psychiatrists— regardless of their competence? Or would nurses or attendants make the diagnoses? And who would analyze reports and compile statistics? Trained statisticians—scientists? Or office workers with commercial educations?

But if reliable statistics are not available for much of the country, can reasonable inferences be drawn from statistics of known reliability, New York's for instance? Do the New York statistics suggest any sound reason for the inference that the incidence of alcoholic mental diseases in the entire country is higher than in New York State alone?

In New York State, urban population outnumbers rural by something like five to one; as long ago as 1930, the United States Census Bureau reported the State to be 83.6 per cent urban. In his study of "Thirty Years of Alcoholic Mental Disease in New York State," Dr. Pollock observed: "It is evident that the cases come principally from cities." In an independent study, "Social and Biological Aspects of Mental Disease," Dr. Benjamin Malzberg, senior statistician of the New York State Department of Mental Hygiene, reported rates for the first admissions for the alcoholic psychoses in the civil State hospitals for the three years ending June 30,

1931. He found the average annual rate for urban first admissions exceeded the rural rate in the ratio of 2 to 1. It should be noted, of course, that Dr. Malzberg's figures are for three prohibition years; but the general applicability of his urban and rural first admission ratios may be indicated by their agreement with the conclusions of Dr. Pollock, which were drawn from a study of pre-prohibition, prohibition and repeal periods.

The ratio of urban to rural population in the United States as a whole is much lower than the ratio of urban to rural population in New York State alone. In the absence of reliable statistics to the contrary, it would appear reasonable that New York's heavily urban character would make New York's first admission rate for the alcoholic mental diseases higher, not lower, than that of the country as a whole. And it is the absence of reliable statistics to the contrary which should be stressed.

It is not impossible that the estimate attributed to Dr. Kolb, or even the higher one which Dr. Carroll quotes from Dr. Dayton, may be correct; but comparison with the New York statistics gives reason for doubt, even if the Dayton quotation that "more than one-fifth of all United States mental patients are alcoholics" be read as intending to include all persons with non-alcoholic psychoses who may coincidentally have been to some degree intemperate—in which case any sort of reliable data certainly would be difficult to obtain.

It should be observed here that this discussion concerns a field in which unusual caution would seem demanded in the making of estimates, since it does the cause of temperance no good to exaggerate the prevalence and evils of alcoholism as a public welfare problem.

Estimates are indispensable, of course, in planning a nation-wide mental hygiene program or in discussing a mental hygiene problem of national scope. But where estimates tend to show a conflict with available, scientifically-compiled statistics, it seems desirable to make such estimates public only with due reservations, and to outline, at least, explanations for apparent contradictions. It is also desirable to label them plainly as estimates, wherever and whenever they are used. To non-psychiatric medical men, to non-medical workers in the social service field and to the public in general, the estimates attributed to Dr. Kolb and Dr. Dayton may appear to have all the validity of the accurate New York State statistics—which tend to refute the Kolb and Dayton conclusions.

Too many guesses assume the respectable garments of statistics, garments to which no guess is entitled, not even a shrewd one.

DR. PARKER, KINGS PARK SUPERINTENDENT, DIES

THE PSYCHIATRIC QUARTERLY records with deep regret the death on March 28 of Dr. Charles S. Parker, superintendent of the Kings Park State Hospital. Dr. Parker had been in the New York State hospital service for more than 30 years, all spent at the Kings Park State Hospital.

Dr. Parker was born at Three Mile Bay, N. Y., on March 10, 1887. He was graduated from the Syracuse University medical school in 1909 and interned at Mercy Hospital, Wilkesbarre, Pa., until he was appointed medical interne at Kings Park State Hospital in 1910. When Dr. William J. Tiffany, now Commissioner of the New York State Department of Mental Hygiene, was transferred from Kings Park State Hospital to become superintendent of Pilgrim State Hospital in 1931, Dr. Parker, then first assistant physician, became acting superintendent of Kings Park. He was appointed superintendent on January 1, 1933.

Dr. Parker was a member of the American Psychiatric Association, the Suffolk County Medical Society, the New York State Medical Society and the Long Island Psychiatric Society. He was vice president of the National Bank of Kings Park.

He leaves his wife, the former Elizabeth MacConnell of Brooklyn, and two children.

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SIR FREDERICK BANTING, INSULIN DISCOVERER, DIES

The PSYCHIATRIC QUARTERLY notes with regret the accidental death on February 20 of Sir Frederick Banting, winner of the Nobel prize for his work in the discovery of insulin, now so widely used in the shock treatment of schizophrenia. Sir Frederick, Canadian surgeon and research worker, and a veteran of the first World War, was on an important military mission when the airplane in which he was a passenger crashed in Newfoundland. He was on active duty as a major in the Canadian army, engaged in research on the medical problems involved in aviation and tank warfare.

Sir Frederick's search for and discovery of insulin as a remedy for diabetes has, of course, been told and retold for years as one of the dramas of medical history. He received the Nobel prize in 1922, jointly with Dr. J. R. McLeod, under whose auspices he had conducted his researches at the University of Toronto. At that time, Dr. Banting divided his share of the prize with Dr. Charles H. Best, his coworker, insisting that Dr. Best receive equal credit with him for the discovery.

Dr. Banting was created a knight commander of the Order of the British Empire in 1934. He leaves a widow, the former Miss Henrietta Ball of Newcastle, New Brunswick.

AMERICAN PSYCHIATRIC ASSOCIATION

The annual meeting of the American Psychiatric Association will be conducted at Richmond, Va., May 5 to 9, 1941. Dr. James K. Hall of Richmond will be elected president to succeed Dr. George H. Stevenson. Dr. H. Douglas Singer of Chicago had been chosen president-elect at the Cincinnati meeting of the association in May of last year; but he died last August 28 as the result of an automobile accident, and the position of president-elect is now vacant. Dr. Arthur H. Ruggles of Providence, R. I., will be named as the new president-elect at the Richmond meeting.

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ST. ELIZABETHS SOCIETY TO MEET

The fourth annual meeting of the Medical Society of St. Elizabeths Hospital will be conducted in Washington on April 26. Members will be luncheon guests on that day of Dr. Winfred Overholser and Mrs. Overholser; papers on neurologic and psychiatric topics will be presented by members in the afternoon; and Sir Willmott Lewis, Washington correspondent of the London Times, will be guest speaker at the annual dinner in the evening. Further details of the meeting may be obtained from the secretary, Dr. Manson B. Pettit, St. Elizabeths Hospital, Washington.

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DR. HENRY L. K. SHAW IS DEAD AT 67

It is with regret that THE PSYCHIATRIC QUARTERLY records the death in Albany on March 26 of Dr. Henry L. K. Shaw, widely-known pediatrician who founded the Child Hygiene Division in the New York State Department of Health. As a young physician, Dr. Shaw served in the New York State Department of Mental Hygiene as clinical assistant at the St. Lawrence State Hospital; he was junior assistant physician at the Utica State Hospital in 1897 and 1898; and he retained a life-long interest in the problems of mental hygiene.

Born in Pennsylvania in 1873, he was educated at Pennsylvania Military College, Cornell University and Albany Medical College, from which he was graduated in 1896. He studied later in Vienna and Munich. Dr. Shaw founded the baby-welfare stations of the State Department of Health in 1910 and formed the Child Hygiene Division in 1913. He was director of that division for seven years. He was translator and author of books and articles on children's diseases and child health problems. His wife and two daughters survive him.

DR. TRAVIS GOES TO MANHATTAN

Dr. John H. Travis, superintendent of Willard State Hospital since January 1, 1938, was transferred as superintendent to Manhattan State Hospital on March 1, 1941. Manhattan State Hospital had been without a superintendent since the transfer of Dr. Willis E. Merriman to be superintendent of Utica State Hospital, succeeding Dr. Richard H. Hutchings, on November 1, 1939.

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SAFEGUARDING CIVILIAN MENTAL HEALTH

A campaign to safeguard civilian mental health during the period of the military emergency is announced by the military mobilization committee of the American Psychiatric Association, of which Dr. Harry A. Steckel, superintendent of the Syracuse Psychopathic Hospital, is chairman.

A subcommittee, headed by D. Ewan Cameron, M. D., of Albany, has been set up to deal with this problem. Foremost among the matters under consideration, says the committee's announcement, is the matter of maintaining adequate psychiatric service for the civilian population. The announcement says:

"A number of psychiatrists have already been called out for the armed forces and, in addition, a considerable amount of time is being devoted by psychiatrists in private practice to examination of men called under the Selective Service Act. It seems probable that the demands made by the armed forces will increase considerably.

"Several approaches to this problem of maintaining adequate psychiatric service have been considered by the subcommittee. Among them is the further promotion of community psychiatry. Closer interaction with the social work agencies and other organizations in the community which are interested in social welfare, together with further and intensified exploration of the field of community psychiatry, may be reasonably expected to provide means of extending the activity of psychiatric personnel over wider groups.

"With this in mind, the subcommittee has approached the various psychiatric journals throughout the country with the request that they might give what prominence they felt fit to this matter. We have also communicated with the regional psychiatric societies and branch associations suggesting their promotion of discussion of problems of community mental health organization during the present period. The response from both the journals and societies and associations has been most encouraging."

DR. JOHN J. MacPHEE DIES AT 80

The PSYCHIATRIC QUARTERLY regrets to record the death at the age of 80 of Dr. John J. MacPhee, prominent for many years in New York City neurological circles. He died on February 17 after a brief illness.

Dr. MacPhee was former director of the neurological department of the New York Post-Graduate Medical School and Hospital and was for years active as a consultant for other New York City hospitals. He leaves his widow, Mrs. Louise Wells MacPhee.

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A COMMITTEE TO PUBLISH DR. SCHILDER'S WORK

The Society for Psychotherapy and Psychopathology of New York has appointed a committee to arrange for the publication of one or more of the books of the late Dr. Paul F. Schilder, internationally known psychiatrist and psychoanalyst, who died following an automobile accident last December. Dr. Bernard Glueck heads the committee; and contributions to make the planned publications possible may be sent to the committee's secretary, Frank J. Curran, M. D., 404 East Fifty-fifth Street, New York City.

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NICHOLS MEMORIAL COTTAGE OPENS

The Nichols Memorial Cottage, a $225,000 one-story, brick structure to house acutely ill women patients, was opened at the New York Hospital—Westchester Division, White Plains, N. Y., on March 5. The building is named in memory of Dr. Charles H. Nichols who planned Bloomingdale's Hospital, now the New York Hospital—Westchester Division, and was its superintendent from 1877 until his death in 1889.

Dr. Clarence O. Cheney, medical director of the New York Hospital—Westchester Division, and Augustine J. Smith, chairman of the Society of the New York Hospital's Westchester committee, welcomed visitors at the new structure the day before the opening.

The cottage was built with funds provided in part by Dr. Nichols' widow and in part by the Society of the New York Hospital. It has a capacity of 20 beds and facilities for the most modern forms of psychiatric treatment.